FormsPro 4300, FormsPro 4500 and FormsPro 4503

SERIAL MATRIX PRINTERS

Operation Manual

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Printek Part Number 2975

USER NOTIFICATION OF FCC RULES PART 15, SUBPART A FOR CLASS A DEVICES (Sections 15.105 and 15.21)

This equipment has been tested and found to comply with the limits for a Class A Digital Device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference in which case the user will be required to correct the interference at his own expense.

The user is cautioned that any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

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This is to certify that the FormsPro 4300, FormsPro 4500, and FormsPro 4503 printers are shielded against radio interference in accordance with the provisions of VDE 0871/6.78.

The German Postal services have been advised that this device is being put on the market and are entitled to inspect the series for compliance with the regulations.

Interface cables: All interface cables to and from this device must be shielded.

Equipment which can be operated within a system together with other devices must comply with the requirements of the class B limits as specified in DIN/VDE 0871/6.78, Section 3.2 as well as the provisions specified in §2 section 1 and section 3 of the Vfg 1046/1984 when use is made of a General (Operating) Permit.

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INTRODUCTION

HOW TO USE THIS MANUAL

This manual provides information on how to install and operate your FormsPro 4000 series printer. Below is a brief description of the information that is presented in each section. For your convenience, a glossary of printer related terms is included at the back of this manual.

Introduction	Provides you with an introduction to the capabilities and operation of the FormsPro 4300, FormsPro 4500 and the FormsPro 4503 printers.
Installation and Quick Setup	Helps you select an appropriate location for the printer, and then test and perform the initial setup of the unit.
Operation	Describes the control panel and ways to modify the operating parameters which may be set for each of the ten form setups and the host computer interface. Changing the paper, using the three tractor paths in the FormsPro 4503, and changing the ribbon are also described.
Using Special Features	Describes special messages which you may encounter when you unload forms, how paper-error conditions are handled, how ribbon usage is monitored, and how to use the Page Reprint feature.
In Case of Difficulty	Describes what you should do in the event you encounter difficulty using your printer, and provides you with a list of possible causes for various symptoms and error messages. Also included is information about where you can obtain service, if it is required.

Following the above sections are appendices containing ASCII character tables and font samples, additional control panel features, detailed interface specifications for the optional interfaces, information on how to clone setup information from one printer to another, and printer specifications.

PRINTER MODEL DESCRIPTIONS AND KEY FEATURES

The Printek FormsPro 4000 series printers are heavy duty serial dot matrix printers. The FormsPro 4300 is a medium speed printer and the FormsPro 4500 and FormsPro 4503 are high-speed printers. They have been specifically designed for printing on hard to print forms which are often not printed adequately by other printers. Of course, the FormsPro 4000 series printers will also print on lighter forms.

All models provide straight paper paths for jam-free paper motion and a zero waste tear bar for demand document applications.

You can permanently record up to ten complete sets of form parameters, which may then be selected either at the printer's control panel or from the host computer. The FormsPro 4503 provides three sets of tractors, any of which may be selected in the form parameters for a particular form. This allows the printer to automatically unload one form and load another when it is selected either via the front panel buttons or a software command from the host computer. When loading forms, the printer will automatically adjust the print head position to match the thickness of the newly loaded form.

The printers come equipped with basic bar code capability, an industry standard parallel interface and an RS-232C serial interface.

You can also order the printers with an optional RS-422 serial interface, or a coaxial/twinaxial interface which emulates an IBM 3287 or 3262 printer, or an IBM 4214, 5225, or 5256 printer.

Other options include a 32K buffer, which increases the standard 4K character input buffer to 28K characters, the Imager and ImagerPlus bar code capabilities, and the FormsCutter which may be used to cut each form as it is printed or to separate reports.

A specially designed print stand, which holds multiple paper supplies, is also available.

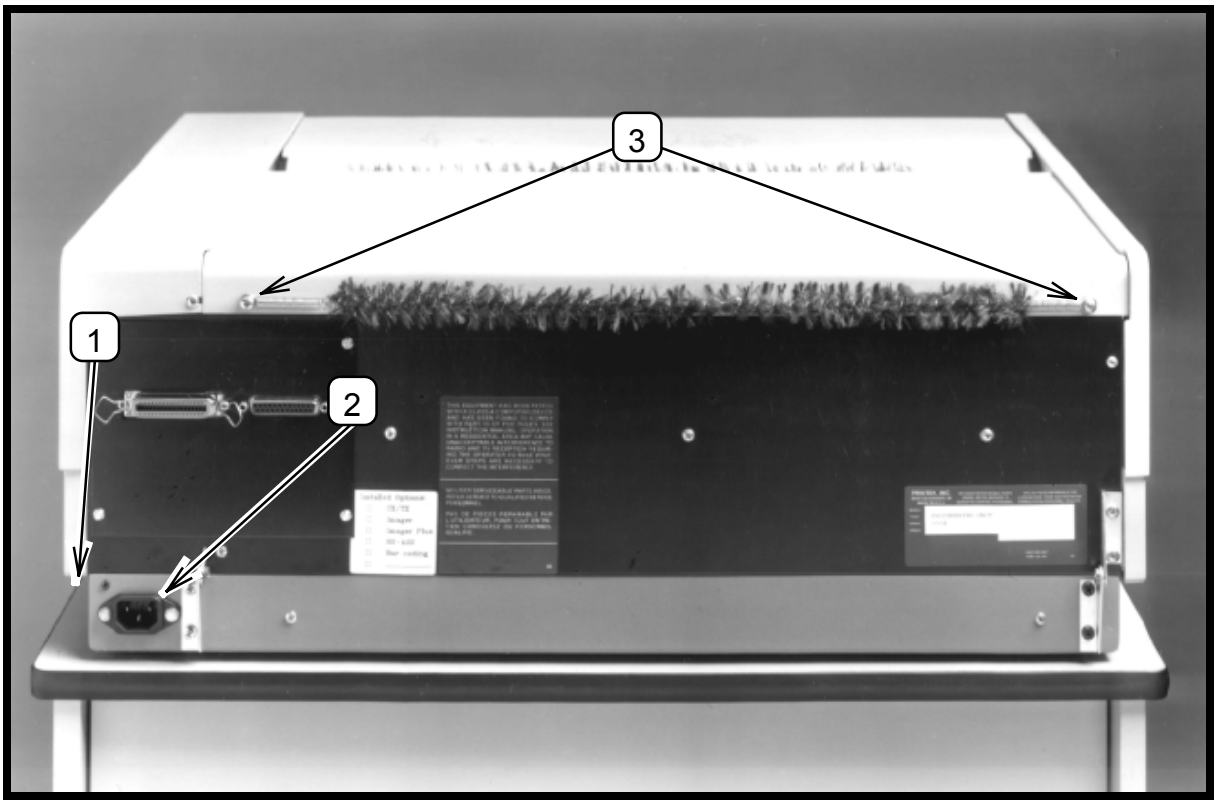
INSTALLATION AND QUICK SETUP

SELECTING AN APPROPRIATE INSTALLATION LOCATION

The FormsPro 4000 series printers are designed to be installed on a Printek print stand, or on an open-top print stand that allows paper to be fed through the paper supply slot on the bottom of the printer. Since the printer also draws air through this slot for cooling, make sure that no part of the print stand obstructs this slot. After cooling the electronics, the motors, and the print head, the air is exhausted through the paper exit slot on top of the printer.

The installation location also requires power for the printer, support for cabling requirements to your computer, and space for the paper supply(s) and printed paper collection.

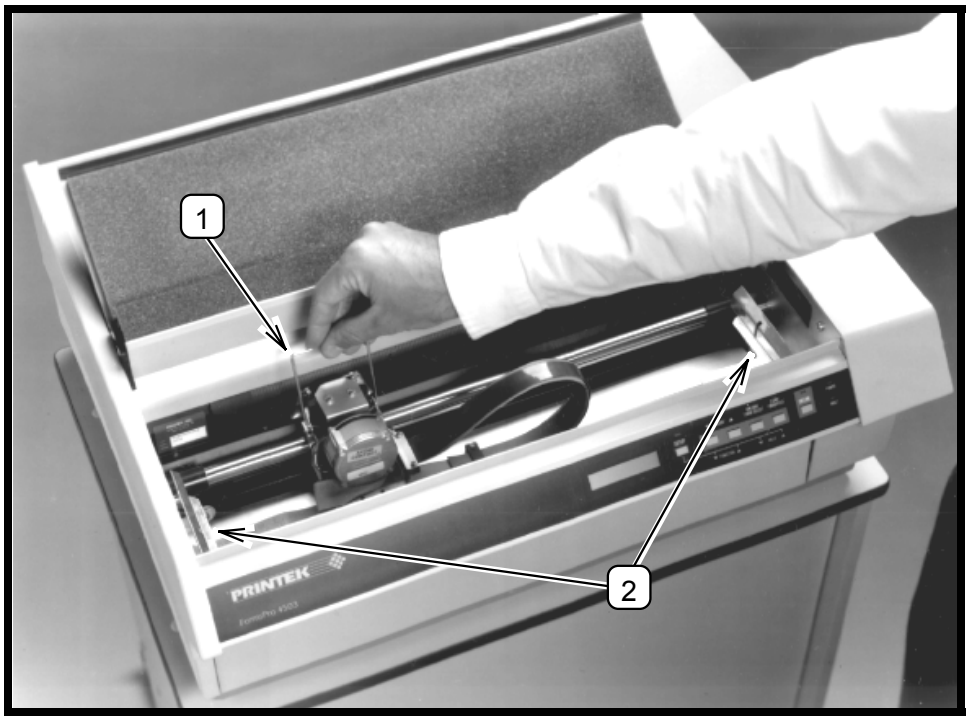
After you unpack the printer as described in the unpacking instructions (make sure all packing materials are removed as described) and place the printer at the desired location, connect the power cord to the rear of the unit and plug the other end into a proper wall outlet.



1. **Power Switch on Side of Printer.**
2. **Power Cord Connector.**
3. **Mounting Screws for Static Suppression Tinsel.**

INSTALLING THE RIBBON

To install the ribbon, first lift the lid on the top of the printer; then lift the ribbon loading bail as shown below.



1. Ribbon Loading Bail in up (open) position.
2. Ribbon Support Brackets.

Unpack the ribbon from its shipping container and remove the retainer from the slot on top of the cartridge if present. Make sure the ribbon fabric is not twisted where it enters the cartridge; then tighten the ribbon by turning the knob on top of the cartridge in the direction indicated by the arrow on the cartridge.

Place the right end of the ribbon on the support bracket while you align the plastic tabs with the slots in the bracket as shown on the next page. Then align and lower the left end of the ribbon onto the left support bracket until it snaps into place. While doing so, the ribbon fabric should lower into the area between the print head and the pins which support the metal nose shield.

Ribbon Cartridge Installation.

Next lower the ribbon loading bail as shown below. This automatically places the ribbon between the ribbon guides and the print head as the print head is placed back into the printing position.

Lowering (closing) Ribbon Loading Bail.

INSTALLING PAPER

If the printer is not currently turned on, push the ON-1 side of the power switch on the right side of the printer. After you turn on the printer, it performs several self tests. If the printer is a FormsPro 4503, these tests also make sure that the tractors are properly positioned after shipment.

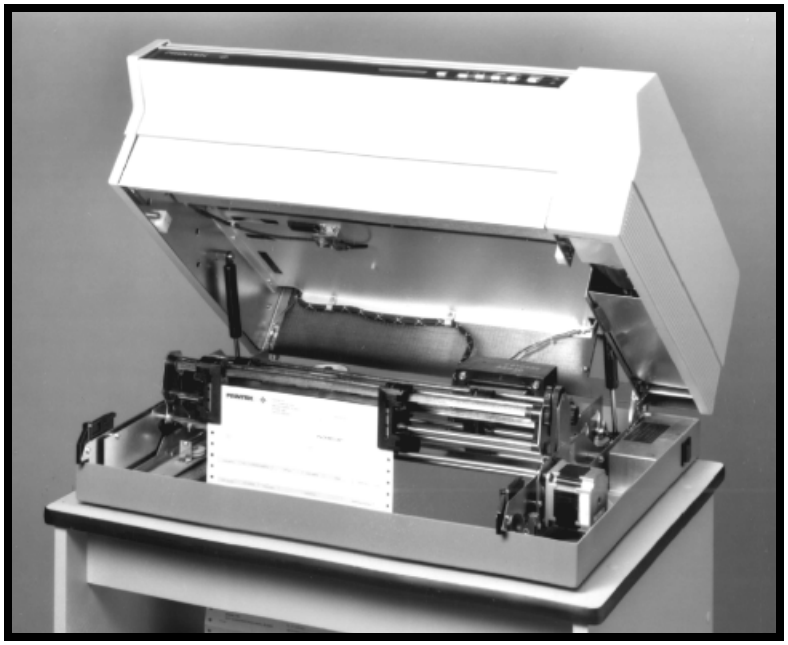
Paper is installed through the slot in the bottom of the printer. To open the unit so you can install paper, pull outward on the bottom of the lower front panel of the printer as shown to release the latch.

Opening Latch Panel.

While you pull outward on this panel, lift the front of the unit to expose the paper tractors. The top of the unit will support itself in the up position while you load paper.

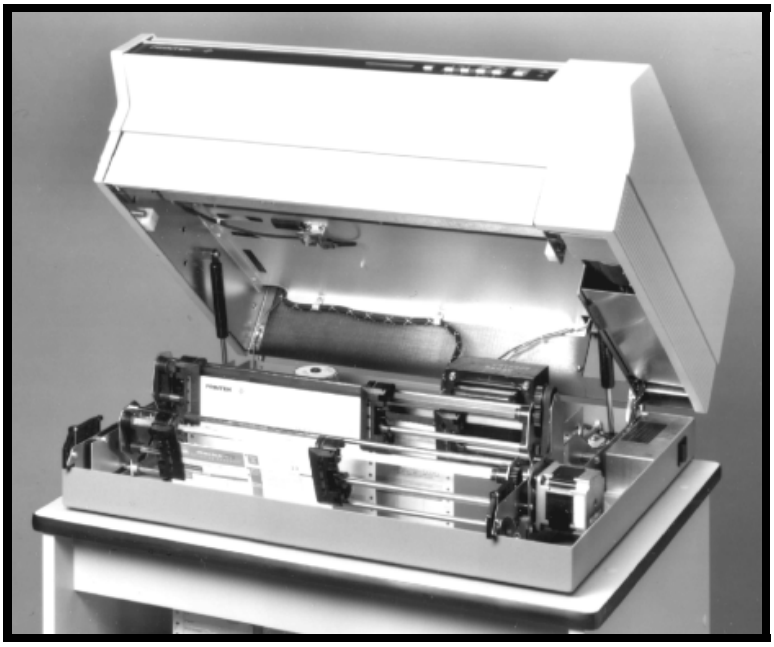
<u>Caution</u>: Do not open the unit in this fashion while the printer is printing or forms are loaded. Doing so may cause data to be printed incorrectly or paper to jam when the cover is closed. Refer to the "Operation" section for information about unloading forms.

To load paper or forms, open the door on each tractor and position the holes in the paper over the pins in the tractors; then close the doors. If the tractors are not set at the proper width for the paper you are loading, simply move the lever beside the tractor door to the open position and the tractor(s) will slide sideways. The tractors should be spaced far enough apart so that the paper does not buckle in the center, but not so tight that the holes in the paper become distorted by the pins in the tractors. A properly installed form is shown below. Note that the form does not extend above the top of the tractor doors.



FormsPro 4503 With Form Installed in Front Tractors.
Note that the forms do not extend above the tractor doors.

The FormsPro 4300 and FormsPro 4500 have only one set of tractors which are positioned in the same location as the front tractors in the above picture. To install forms in the other sets of tractors in the FormsPro 4503, press the FORM SELECT button on the front panel until the desired form setup and tractor path is selected on the LCD display (this button's sequence is 0 through 9, and back to 0, and may be operated while the case is either opened or closed). Then press the LOAD button. This causes the selected tractors to move into position for loading. Now load the paper or forms in the tractors as described in the previous paragraph. Now close the case, select the form you desire (0 through 9), and press the LOAD button. This places the form you have selected into position for printing. The following picture shows a FormsPro 4503 with forms installed in all three sets of tractors and the center tractors in place for operation.



**FormsPro 4503 With Forms in All Tractor Paths.
Center Path Positioned for Loading.**

TESTING THE PRINTER

When you turn the printer on, it automatically performs a series of self tests to assure that the electronics and printer mechanisms are operational. In the FormsPro 4503, the shuttle mechanism, which positions the tractors, also realigns itself if there is no paper installed or the paper is not positioned above the tear bar.

If you wish to perform an actual printing test, perform the following steps to print a barberpole test pattern:

1. Load plain paper that is eleven inches long. The pattern that is printed will be a maximum of 80 columns wide.

2. Make sure that the printer is offline (the ONLINE indicator is not lit). If the printer is on line, press the ONLINE button to turn the indicator off.

3. Press and hold the SETUP button until the second menu "Setup: INTERFACE" is displayed; then release the SETUP button. Note that one beep will sound when the first setup menu for forms is displayed, and two beeps will sound when the second menu for interface is displayed.

4. Press the FUNCTION UP button until "Mode:" is displayed. The current emulation mode will now be displayed. Remember which mode is currently displayed because you will have to return to this value later for normal operation. If you wish, you can record the mode here for future reference. Mode: _____.

5. Press the VALUE UP button until "Mode: BarberPole" is displayed.

6. Press the SETUP button to exit setup mode. The printer will now reset and perform the normal power-up diagnostics. Once these complete, the printer will begin to print the barberpole pattern. To stop or resume printing the pattern, use the ONLINE button.

7. Once you have printed the pattern long enough to be sure the printer is operating properly, press the ONLINE button to stop printing.

8. Press the FORM FEED button to advance the top of the next page to the tear bar and tear off the printed page(s).

9. Return to the interface setup menu as described in step 3 above, and set the Mode value back to its previous setting that you noted in step 4.

10. Press SETUP to exit setup mode. The printer will reset and return to normal operating mode.

CONNECTING THE PRINTER TO A COMPUTER

The FormsPro 4000 series printers are supplied with an industry standard parallel interface and an RS-232C interface as standard equipment. The printers are also available with an RS-422 interface, or a coaxial/twinaxial interface.

When the printer is shipped from the factory, the default configurations for these interfaces are as shown below. If these are not appropriate for your installation, refer to the "Parallel Interface" or "RS-232C Interface" sections which follow, or to one of the appendices if you are using an optional interface.

Parallel and RS-232 Interface

Mode: Epson
I/O: Parallel
Data Bits: 8

RS-422 Interface

Mode: Epson
Baud Rate: 9600
Data Bits: 8
Parity: None
XON/XOFF: On

Coaxial/Twinaxial/Parallel and RS-232 Interface

Mode: Epson
I/O: CX/TX
Data Bits: 8

ENTERING THE INTERFACE MENU AT THE CONTROL PANEL

In each of the following descriptions for connecting the printer to a computer, you may need to access the printer's interface setup menu. The following paragraphs show you how to do this.

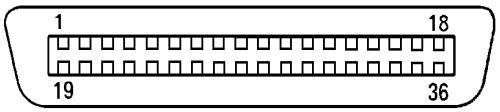
After you connect the appropriate cable(s), as described in the section for the interface being installed, turn the printer on.

If the printer is online (ONLINE indicator is on), press the ONLINE button on the front of the printer to take the printer offline. This will cause the ONLINE indicator to turn off, and the display will momentarily show an “OFFLINE” message to indicate that the printer is now offline.

Next, press and hold the SETUP button. After approximately one second, the display will show "**Setup: FORMS**" and beep once. Continue to hold the SETUP button for approximately one more second until the display shows "Setup: INTERFACE" and beeps twice. Then release the button. You have now entered the printer's interface setup menu and can now proceed with the instructions listed below for the interface you desire to use.

Parallel Interface

The 36-pin connector for the parallel interface is located on the rear of the printer immediately above the power cord connector. Connect a shielded cable between your computer and this connector. The pin-out for this connecter is shown in the following diagram.



Pin	Signal	Definition	Pin	Signal	Definition
1 19	$\overline{\text{DATA STROBE}}$ DATA STROBE RTN*	A host generated signal which signals that data lines are stable and that the data may be stored in the printer buffer.	11 29	BUSY BUSY RTN*	A printer generated signal which indicates that the printer is unable to receive data. Busy will be set under the following conditions: Character received. Input buffer is full. Printer is not on line (see SLCT). Paper error (see PE). Fault (see FAULT).
2 20	DATA 1 DATA 1 RTN*	Host data bit 1 (LSB).			
3 21	DATA 2 DATA 2 RTN*	Host data bit 2.			
4 22	DATA 3 DATA 3 RTN*	Host data bit 3.			
5 23	DATA 4 DATA 4 RTN*	Host data bit 4.	12	PE	A printer generated signal which indicates a paper out or paper jammed condition.
6 24	DATA 5 DATA 5 RTN*	Host data bit 5.	13	SLCT	A printer generated signal which indicates that the printer is on line and ready to receive data.
7 25	DATA 6 DATA 6 RTN*	Host data bit 6.			
8 26	DATA 7 DATA 7 RTN*	Host data bit 7.	14	±0V	Signal ground.
9 27	DATA 8 DATA 8 RTN*	Host data bit 8 (MSB).	16	±0V	Signal ground.
			31 30	$\overline{\text{INPUT PRIME}}$ INPUT PRIME RTN*	Ignored.
10 28	$\overline{\text{ACKNLG}}$ ACKNLG RTN*	A printer generated signal which is transmitted after the receipt of each data character and negation of the BUSY.	32	$\overline{\text{FAULT}}$	A printer generated signal which indicates that the printer requires attention.

*RTN = Signal ground.

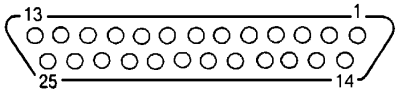
Parallel Interface Connector.

Enter the interface menu as described above. Then press the FUNCTION UP button to display the "I/O:" function. Now press the VALUE UP button until "Parallel" is displayed (or CX/TX if that option is installed). Now press the FUNCTION UP button again to display the "Data Bits:" function. Use the VALUE UP button to select either 7 or 8 data bits as required by your computer and/or software. This will normally be set to 8.

Finally, press the SETUP button to exit the setup mode and reset the printer. The printer is now ready to receive parallel data.

RS-232C Serial Interface

A 25-pin female "D" type connector is located on the rear of the printer immediately to the right of the 36-pin parallel connector (or above it if the coaxial/twinaxial interface is installed). Connect a shielded cable between your computer and this connector. The pin-out for this connector is shown below.



Pin	Signal
1	Chassis ground.
2	Transmit data. (Printer output).
3	Receive data. (Printer input).
4	Request to send (set). (Printer output).
5	Clear to send (ignored). (Printer input).
6	Data set ready (ignored). (Printer input).
7	Signal ground.
8	Carrier detect (ignored). (Printer input).
11	Printer busy. (Printer output).
20	Data terminal ready. (Printer output).

RS-232C Serial Interface Connector.

To configure the printer for serial data, more information is required than for some of the other interfaces. In particular, you must know the baud rate, number of data bits, type of parity checking, and flow control method required by your computer. Check your computer manual or contact your computer dealer for this information.

Enter the interface menu as described above. Then press the FUNCTION UP button to display the "I/O:" function. Now press the VALUE UP button until "Serial" is displayed.

Before proceeding, the factory default values for the RS-232C serial configuration are 9600 baud, 8-data bits, no parity, busy-polarity low, and XON/XOFF and ETX/ACK handshakes off. If your computer requires you to change any of these parameters, please refer to "Entering the Interface Setup Menu" in the Operation section of this manual. Otherwise, simply press SETUP again to exit the setup mode and reset the printer. The serial interface with the above parameters is now active.

MATCHING THE PRINTER TO YOUR APPLICATION SOFTWARE

Many application programs output only printable characters and simple control codes. However, some require special printer features and use a particular "language" or set of control codes and escape sequences to direct the printer to enable or disable these features. The FormsPro 4000 series printers supply emulations for the control codes and escape sequences used by the ANSI X3.64 specification, Epson FX series printers, IBM Proprinter, Digital Equipment Corporation's LA-120, a simple TTY emulation mode (which ignores most control codes and escape sequences), and a special Printek emulation mode. The Printek emulation may be used at any time to control features which are not supported by the other printers being emulated. To review the list of control codes and escape sequences supported by these emulations, refer to the appropriate section in the Programmer's Manual. The Programmer's Manual may be obtained by returning the request form packed with the printer.

To complete the initial setup of your printer, you will need to know which set of control codes and escape sequences your applications will use to control the printer. Refer to your computer and application software manuals or contact your computer and/or software dealer for this information.

To select the desired emulation, you will need to first enter the interface setup menu as described in the following paragraphs, and then proceed to the appropriate section below to select the emulation.

If the printer is online (ONLINE indicator is on), press the ONLINE button on the front of the printer to take the printer offline. This causes the ONLINE indicator to turn off, and the display to momentarily show an "OFFLINE" message to indicate that the printer is now offline.

Next, press and hold the SETUP button. After approximately one second, the display will show "**Setup: FORMS**" and beep once. Continue to hold the SETUP button for approximately one more second until the display shows "Setup: INTERFACE" and beeps twice. Then release the button. You have now entered the printer's interface setup menu and can now proceed with the instructions listed below for the emulation you desire to use.

Selecting ANSI X3.64 Emulation

Enter the interface menu as previously described. Press the FUNCTION UP button to display "Mode: n". Then use the VALUE buttons to select "ANSI X3.64". Press SETUP again to exit the setup mode and reset the printer. ANSI X3.64 emulation is now selected.

Selecting Epson Emulation

Enter the interface menu as previously described. Press the FUNCTION UP button to display "Mode: n". Then use the VALUE buttons to select "Epson". Press SETUP again to exit the setup mode and reset the printer. Epson emulation is now selected.

Selecting Proprinter Emulation

Enter the interface menu as previously described. Press the FUNCTION UP button to display "Mode: n". Then use the VALUE buttons to select "Proprinter". Press SETUP again to exit the setup mode and reset the printer. Proprinter emulation is now selected.

Selecting DEC LA 120-RA Emulation

Enter the interface menu as previously described. Press the FUNCTION UP button to display "Mode: n". Then use the VALUE buttons to select "LA-120". Press SETUP again to exit the setup mode and reset the printer. LA-120 emulation is now selected.

Selecting TTY Emulation

Enter the interface menu as previously described. Press the FUNCTION UP button to display "Mode: n". Then use the VALUE buttons to select "TTY". Press SETUP again to exit the setup mode and reset the printer. TTY emulation is now selected.

Selecting Printek Emulation

Enter the interface menu as previously described. Press the FUNCTION UP button to display "Mode: n". Then use the VALUE buttons to select "Printek". Press SETUP again to exit the setup mode and reset the printer. Printek emulation is now selected.

OPERATION

INTRODUCTION

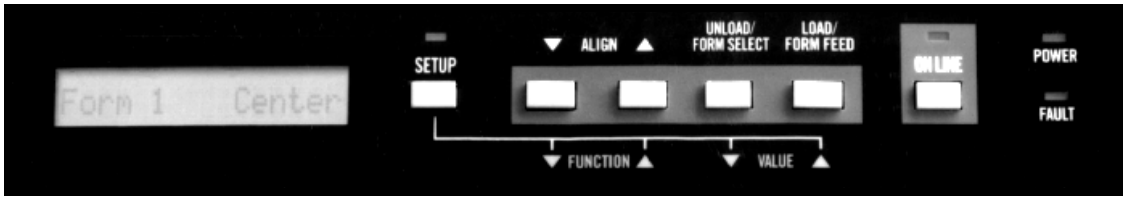
This section assumes that your printer has already been installed according to the information in "Installation and Quick Setup", and describes the daily operation of the FormsPro 4000 series printers. In particular, using the control panel, changing paper or forms, and changing the ribbon cartridge are discussed.

CONTROL PANEL OPERATION AND SETUP MENUS

The FormsPro 4000 series printers feature an intuitive, easy-to-use control panel which provides immediate access to the controls required by most operators. Individual indicators are available which provide a quick indication of printer status, as well as a 16-character display which provides even more status information.

Many more features, including form and interface parameters, are available through the SETUP mode. All features which are modified during setup are stored in nonvolatile memory and are used each time the printer is turned on or reset. For more information, refer to the appendix on "Printer Reset Conditions".

The printer's control panel consists of six pushbutton switches, four LED indicators, and a 16-character LCD as shown below.



Printer Control Panel.

The pushbutton switches (or buttons), the LCD, and the LED indicators provide you with the following controls and status information:

CONTROL PANEL DISPLAY AND INDICATORS

Sixteen Character Display	This display indicates the printer status. Normally, the currently-selected form (and tractor path on the FormsPro 4503) is displayed. ONLINE, OFFLINE, and other informational and error messages are displayed when the conditions occur and/or you press the ONLINE button without clearing an error condition. This display also indicates various parameters and their values when the printer is in the setup mode.
POWER	This green LED indicates that the printer is plugged into a power source, the power switch is on, and the internal power supply is functional.
ONLINE	This green LED indicates that the printer is ready to receive printable characters and/or commands from the host computer, and print or perform as requested.
FAULT	This red LED indicates that the printer has detected an error condition, such as paper out, paper jam, or an internal diagnostic error. Many internal diagnostics are performed each time the printer is turned on or reset, and some continue to monitor operation during printing. For a list of error messages and suggested remedies, refer to the "In Case of Difficulty" section of this manual.
SETUP	This yellow LED indicates that the setup mode has been entered.
Bell	The printer sounds a tone when it is directed to do so by a bell character (BEL) from the host computer. Other tones also alert operators of error conditions, such as paper out, and indicate when buttons are pressed.

CONTROL PANEL BUTTONS

ONLINE

This button allows you to place the printer online or offline, as indicated by the ONLINE indicator, and as temporarily displayed on the 16-character display. It is also used for starting and stopping the test pattern while the printer is in the Barber Pole mode.

NOTE: The printer must be offline before you can use any of the other buttons.

If you press and hold this button at power-up/reset, internal printer information is displayed on the LCD. For more information, refer to "Checking Printer Configuration" in the "Using Special Features" section of this manual.

LOAD / FORM FEED

When no paper is currently loaded (a paper out condition exists), this button loads the paper which has been installed in the tractors by moving the top edge of the paper to the tear bar. In the FormsPro 4503, this button may also cause the tractor path to change if a form has been selected which uses a different path (refer to UNLOAD/FORM SELECT below).

If paper is already loaded, this button uses the currently selected form length to advance the paper to the top of the next form.

For a description of this button while the printer is in setup mode, refer to "Introduction to Setup" later in this chapter.

UNLOAD / FORM SELECT

If paper is currently loaded (no paper out condition exists), this button unloads the paper and places the top edge of the paper in the tractors in the base of the unit. This allows you to change the paper easily. A paper out condition is displayed to indicate that the paper was unloaded successfully.

The printer will attempt to unload up to 36 inches of paper. If the top edge of the paper is not found, paper motion will stop and "Too Much Paper" will be displayed on the LCD. Normally, previous pages should be torn off before you press UNLOAD. It is recommended that you not use this method to unload more than the current form.

When no paper or form is currently loaded, this button selects one of ten preset form setups. In the

FormsPro 4503, this may also select a different set of tractors to be used the next time you press the LOAD button.

The printer will not allow you to change the form during printing. If you press the FORM SELECT button while there is still a line to print, the button press is rejected, the bell sounds, and the message "Finish Printing!" flashes on the LCD. If this happens, you should place the printer back on-line, allow the form to finish printing, and then place the printer off-line and select the desired new form. For more information, refer to "Finish Printing!" in the "Using Special Features" section.

If you press and hold this button at power-up/reset on the FormsPro 4503, and paper has not been loaded, the tractor shuttle moves all the way forward to its parked position. NOTE: The tractor shuttle should always be parked whenever the printer is being transported.

For a description of this button while the printer is in the setup mode, refer to "Introduction to Setup" later in this chapter.

ALIGN UP

This button is used to adjust the paper in respect to the current form position. To adjust the top of form position, you must insure that the printer is at the top of form before you make this adjustment. You can accomplish this by performing a Form Feed prior to making the adjustment. Each time you press this button, the paper moves up 1/72nd of an inch. If you hold this button down, the paper advances the amount required to complete a line feed (LF) at the currently selected line pitch, and then continues to advance in full line increments. The longer you hold this button, the faster the paper will move.

For a description of this button while the printer is in the setup mode, refer to "Introduction to Setup" later in this chapter.

ALIGN DOWN

This button is used to adjust the paper in respect to the current form position. To adjust the top of form position, you must insure that the printer is at the top of form before you make this adjustment. You can accomplish this by performing a Form Feed prior to making the adjustment. Each time you press this button, the paper moves down 1/72nd of an inch. If you hold this button down, the paper moves the amount required to complete a line feed (LF) at the current line pitch, and

then continues to move in full line increments. The longer you hold this button, the faster the paper will move.

For a description of this button while the printer is in the setup mode, refer to "Introduction to Setup" later in this chapter.

SETUP

This button enters and exits the setup menus that are used to set parameters for up to ten unique form configurations, and for setting the parameters required for the printer to communicate successfully with your computer. This button and a detailed description of the features of the setup mode are described in "Introduction to Setup" which follows.

If you press and hold this button at powerup/reset, the current setup configuration may be printed. Refer to "Printing Setup" in the "Using Special Features" section of this manual.

INTRODUCTION TO SETUP

The setup mode allows you to easily set form parameters for each of the ten form configurations, and to set interface hardware and emulation parameters. To make it easier, the menus and their functions are accessed in the order in which they are most often used. You can access the setup menus by pressing and holding the SETUP button until the desired menu is displayed on the LCD. When setup has been entered, the yellow SETUP indicator lights. At this time, the buttons that have yellow labels below them perform as indicated by those labels. To exit the setup mode, press the SETUP button.

While the printer is in a menu, you can use the FUNCTION UP and FUNCTION DOWN buttons to select any function. Whenever you select a function, its current value is displayed. To change the value or setting of a function, use the VALUE UP and VALUE DOWN buttons. The function values that are entered in all menus are on a "what you see is what you get" basis. Whatever value you leave displayed for any function will become the default value until you change it again. All parameter values are saved in a nonvolatile memory that is used during initialization the next time the printer is turned on or reset. The printer automatically performs a reset when it exits the setup menus so that values just set can be adopted immediately. Refer to appendix on "Printer Reset Conditions" for other values that may be affected.

The next two sections describe the Forms Menu and the Interface Menu. For more advanced features, Refer to the appendix on "Advanced Control Panel Features".

ENTERING THE FORMS SETUP MENU

To change parameters for the currently selected form, first take the printer offline. Next, press and hold the setup button until "**Setup: FORMS**" is displayed (approximately one second) and the bell beeps one time to indicate the first setup menu has been reached. At this time, you are able to view and/or edit the various function values for the currently selected form.

The function values which may be modified and their respective value ranges for any of the ten form selections are listed below. Although you can use the FUNCTION UP or FUNCTION DOWN buttons to select functions, they are listed here in the order of function up. The first function is "Form #:" which will display the form to be modified as you access the other functions. This will initially display the form number that was selected when you first entered setup (see the description of the UNLOAD/FORM SELECT button earlier in this chapter). You may use the VALUE UP or VALUE DOWN buttons to select a different form to modify. However, the form that was selected when you entered setup will still be selected when you exit setup.

In the descriptions below, "F#" refers to "F0" through "F9" to indicate the number of the form currently accessed. The factory default settings are indicated by an asterisk (*) where applicable.

Function	Possible Values	Description
Form #:	0 through 9	Allows you to select the desired form. The printer defaults to the currently selected form.
F# Path:	Front, Center, or Rear	Sets the tractor path to be used for the current form. This function is available only on the FormsPro 4503.
F# Auto Cut:	Yes or No*	Available only when the optional FormsCutter is installed. See FormsCutter manual for additional information.
F# CPI:	10*, 12, 13.3, 15, 16.74, 17.14, or 20	Sets the character pitch in Characters Per Inch.
F# Left Mar:	0* through 134	Sets the left margin in columns (characters) from the leftmost print position. Column width is based upon CPI. The left margin must be less than the right margin.
F# Right Mar:	1 through 255, or MAX*.	Sets the right margin in columns (characters) from the leftmost print position. A value of MAX sets the margin to the rightmost print position, regardless of CPI. The right margin must be greater than the left margin.
F# LPI:	6* or 8	Sets the line pitch to 6 or 8 lines per inch.
F# Length:	1 through 227 (66*)	Sets the form length in lines at the current line pitch. For example: for an eleven inch form, enter 66 if you are using six lines per inch or 88 if you are using eight lines per inch.
F# Top Mar:	0* through 255	Sets the top margin by adding the specified number of lines to the top of the form.
F# Btm Mar:	0* through 255	Sets the bottom margin in lines lines from the bottom of the form.

Function	Possible Values	Description
F# Scroll+:	0* through 127	Sets the distance in lines from the top margin to the first print line of the form (does not add these lines to the form as the top margin does). Scroll can be used to allow existing software to take advantage of the zero-waste capability. If the first line is printed too high on the paper after aligning the edge with the tear bar, use Scroll to position it lower on the page. Scroll does not modify the top of form position. It is not recommended to use this with, or in place of, Top Margin.
F# Cut Adj:	-85 to +84, 0*, or Auto	Available only when the optional FormsCutter is installed. See the FormsCutter manual for more information.
F# Prnt Adj:	-128 through 0*, or 0 through +127	Sets the print position in 72nds of an inch from the top of the form. This may be used to align the vertical print position to match a preprinted form which does not begin at an even number of lines from the top edge of the paper.

Function	Possible Values	Description
F# Font:	FX FD Epson FX Fast Draft FX DF Epson FX Draft FX LQ Epson FX Letter Quality PC FD Proprinter PC Fast Draft PC DF Proprinter PC Draft PC LQ Proprinter PC Letter Quality EB FD EBCDIC Fast Draft EB DF EBCDIC Draft EB LQ EBCDIC Letter Quality OCRA OQ OCR-A Optical Qual OCRB OQ OCR-B Optical Qual PCL2 FD PC Latin 2 (Slavic) Fast Draft PCL2 DF PC Latin 2 Draft PCL2 LQ PC Latin 2 Letter Quality	Selects the font to be used. Fonts not installed will not be displayed.
F# Impact:	Norm* or High	Sets the character printing mode to normal or high impact.
F# Lang:	USA*, France, Germany, England, Denmark, Sweden, Italy, Spain, or Japan	Sets the character substitution table to be used for an alternate language. (Epson font must be selected).
F# Zero:	Normal* or Slashed	Sets the type of zero to be printed.
F# Unidir:	Yes or No*	Sets unidirectional printing instead of bidirectional printing.

ENTERING THE INTERFACE SETUP MENU

The setup menu for interface parameters is the second setup menu. To enter this menu, first take the printer offline (refer to the ONLINE button described earlier). Then press and hold the SETUP button approximately two seconds until "Setup: INTERFACE" is displayed and the bell beeps twice to indicate that the second menu has been entered (Note that "**Setup: FORMS**" will be displayed and the bell will beep once before the interface menu is displayed. Continue to hold the button to pass through this menu and proceed to the interface menu). At this time you are able to view and/or edit the values for the various interface functions as listed below. While you may select functions with either the FUNCTION UP or FUNCTION DOWN buttons, they are listed here in the order of function up.

The factory default settings are indicated by an asterisk (*).

Function	Possible Values	Description
Mode:	*n* = Test, ANSI X3.64, Epson*, Bar Codes, Proprinter, LA-120, TTY, Printek, Barberpole, or Hex Dump	Selects the current emulation mode, barberpole mode, or hex dump mode. The test mode is for factory use only.
I/O:	Parallel*, Serial, or CX/TX (optional)	Selects the active I/O port. If the CX/TX interface is installed, then CX/TX also selects the parallel port. Not available when the RS-422 interface is installed.
Baud Rate:	150, 300, 600, 1200, 2400, 4800, 9600*, or 19200	Selects the baud rate for the serial interface. Not available when Parallel or CX/TX is selected.
Data Bits:	7 or 8*	Selects the number of data bits in the serial character frame and the number of significant data bits in each character received via all other interfaces.
Parity:	None*, Ignore, Odd, or Even	Selects the parity checking requirements for the serial data bits. Not available when Parallel or CX/TX is selected.
Busy:	Low* or High	Selects the polarity of the busy signal (pin 11 of the RS-232C interface). Available only when the RS-232C interface is installed and Serial is selected.

Function	Possible Values	Description
DTR:	Power*, Online, or Busy	Selects the condition to be reflected by the DTR signal (pin 20 of the RS-232C interface). Available only when the RS-232C interface is installed and Serial is selected.
XON/XOFF:	Off* or On	Enables or disables the transmission of the XON and XOFF characters from the printer to the host to control data flow to the printer. Not available when Parallel, or CX/TX is selected.
ETX/ACK:	Off* or On	Enables or disables the ACK response to receipt of the ETX character. Not available when Parallel, or CX/TX is selected.
Auto CR:	Off* or On	Enables or disables automatic Carriage Returns (CR) when a Line Feed (LF), Vertical Tab (VT), or Form Feed (FF) is received.
Auto LF:	Off* or On	Enables or disables automatic Line Feeds (LF) when a Carriage Return (CR) is received.
Long Line:	Wrap* or Trunc	Sets whether characters beyond the right margin will be wrapped to the next line or truncated.
Left Edge:	Fixed or Float*	Sets whether the left edge of the line will be printed 1/2 inch from the detected edge of the paper or be fixed at position “0” on the ruler.
FF at TOF:	Yes* or No	Sets whether Form Feeds (FF) will be performed when received from the host computer if the paper is already positioned at the top of form (TOF).

Function	Possible Values	Description
Scroll Delay:	0, 1*, 2 through 15	Sets the number of seconds to delay before scrolling the top of form to the tear bar when the printer is idle and a form boundary has been reached.
Fault:	Break Pg*, or Reprint Pg	Selects whether a paper-out condition causes a Page Break or allows you to reprint the page. For more information, refer to "Page Reprint" in the "Using Special Features".
Page Size:	256* or 512 through 28160	Sets the page size in characters, when Page Reprint is selected. When you do not use page reprint, leave the value set to 256. For more information, refer to "Page Reprint" in the "Using Special Features" section.
Chars:	Control* or Printable	Selects whether certain control character symbols will be printed (emulation dependent), or be treated as control characters.

CHANGING THE PAPER

This section assumes that you are familiar with the operation of the control panel buttons as described in "Control Panel Buttons" earlier in this chapter.

Changing the Form in the Tractors

To unload the currently loaded paper or form, place the printer offline and press the UNLOAD/FORM SELECT button. This positions the top of the paper in the tractors in the base of the printer.

To open the case for access to the tractors, pull out on the bottom of the lower front panel of the printer to release the latch as shown below:

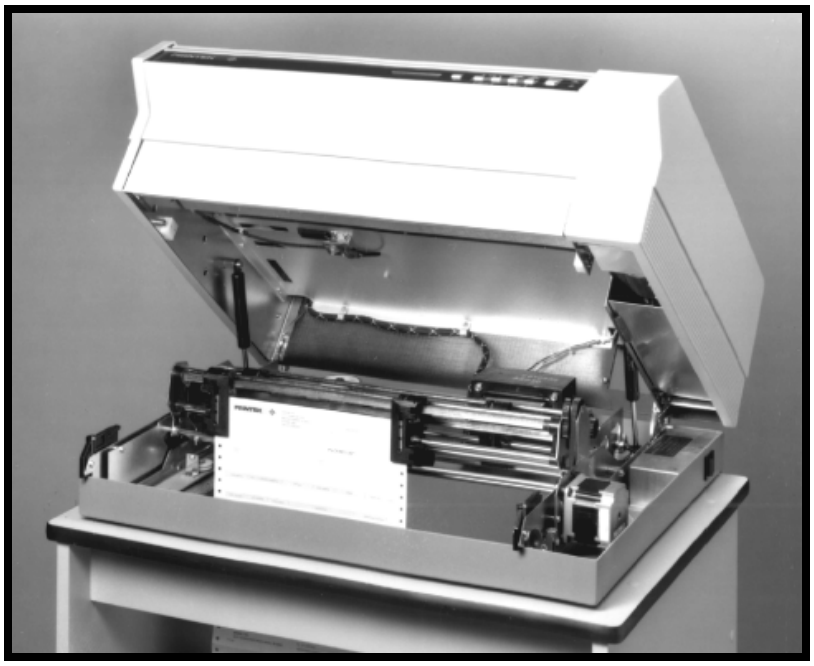
Opening The Latch Panel.

While pulling out on this panel, lift the front of the printer to expose the paper tractors. The top of the unit will support itself in the up position while you load paper.

> **Caution: Do not open the unit in this fashion while the printer is printing or forms are loaded. Doing so may cause data to be printed incorrectly or paper to jam when the unit is closed. Refer to the section on Control Panel Operation for instructions on unloading forms.**

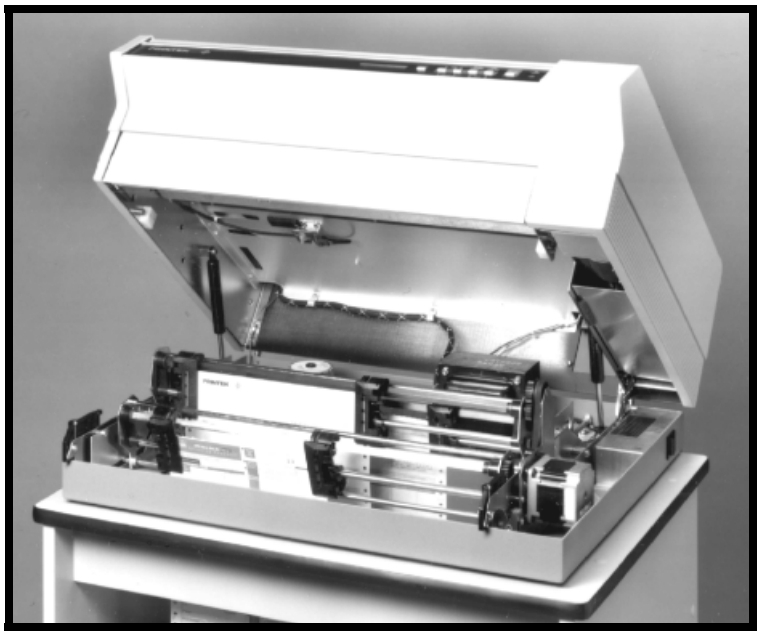
Open the doors on the tractors and remove the paper or form through the slot in the base of the printer.

Bring the new paper up through the slot in the base and position the holes of the paper over the pins in the tractors; then close the doors. Position the left tractor as shown on the label located in the base of the printer. If the tractors are not set at the proper width for the paper being loaded, simply move the lever beside the tractor door to the open position and slide the tractor(s) sideways. Space the tractors far enough apart so the paper does not buckle in the center, but is not so tight that the holes in the paper become distorted by the pins in the tractors. A properly installed form is shown below. Note that the paper is not above the tops of the tractor doors.



FormsPro 4503 With Forms Installed in Front Tractor Path.
Note that the forms do not extend above the tractor doors.

If your printer is a FormsPro 4503, and you wish to install paper in the other tractor paths, you may do so at this time. If your printer is a FormsPro 4300 or FormsPro 4500, or if you do not wish to load other paths, proceed to the next paragraph. You can position the other tractor paths for loading without closing the printer's case. To load another tractor path, press the UNLOAD/FORM SELECT button on the front panel until the desired form and tractor path is indicated on the LCD display. Then press the LOAD button. This causes the selected tractors to move into position for loading. You may now install the paper in this tractor path.



**FormsPro 4503 With Forms in All Tractor Paths.
Center Path Positioned for Loading.**

Close the case of the printer by lowering it until the lower front panel closes. The printer LCD will display "Case Closed" when you do this.

Check the LCD to make sure the correct form setup (0-9) has been selected. If necessary, press the UNLOAD/FORM SELECT button until the correct one is displayed.

Now press the LOAD/FORM FEED button to position the top of the paper at the tear bar. The printer LCD will display "Load Paper" when you do this. After the paper is loaded, the LCD will display the form number, and if a FormsPro 4503, the path.

Paper installation is now complete. Press the ONLINE button to place the printer back on-line.

FormsPro 4503: Changing to a Form Installed in Another Path

To unload the currently loaded paper or form, first tear off any forms that have been printed. Then take the printer offline and press the UNLOAD/FORM SELECT button. This positions the top of the paper in the tractors in the base of the printer.

Press the UNLOAD/FORM SELECT button until the desired form and path are displayed on the LCD. Then press the LOAD/FORM FEED button. The tractors will move to the specified path (if necessary) and position the top of the selected form at the tear bar. Press the ONLINE button to place the printer back into operation.

CHANGING THE RIBBON

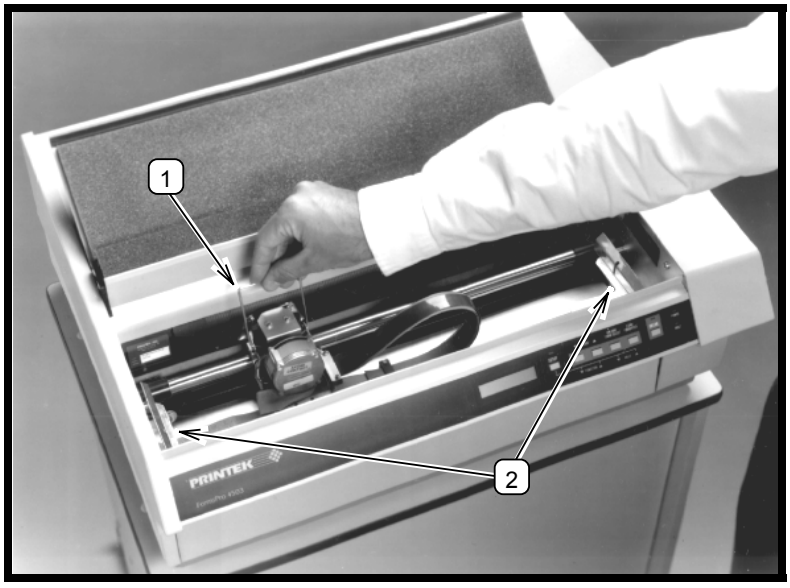
Caution: When you access the ribbon loading bail as described below, the print head may be hot if a long report has just finished printing. Although the print head should never be hot enough to cause a burn, you may wish to wait several minutes before changing the ribbon.

Using Printek Ribbons

The use of * PRINTEK ribbons provides several advantages. Most importantly, Printek ribbons provide the maximum ribbon life and print head life possible. They also allow the printer's automatic ribbon change indicator system to operate. While it is possible to use non-Printek ribbons in your printer, doing so will limit the warranty on the print head and other mechanisms which are used to advance the ribbon fabric. If you choose to use non-Printek ribbons, you must disable the ribbon sensing system as described in the appendix titled "Advanced Control Panel Features".

Removing the Old Ribbon

To remove the old ribbon, first open the lid on the top of the printer and lift the ribbon loading bail as shown below.



1. **Ribbon Loading Bail in Up (open) Position.**
2. **Ribbon Support Brackets.**

Remove the old ribbon by lifting the left hand end of the ribbon off of the left support bracket. Then lift out the other end of the ribbon and set the ribbon aside. If the printer power is on, "Ribbon Removed" will be displayed as the ribbon is lifted out.

Installing the New Ribbon

Unpack the new ribbon from its shipping container and remove the retainer from the slot on top of the cartridge if present. Make sure the ribbon fabric is not twisted where it enters the cartridge; then tighten the ribbon by turning the knob on top of the cartridge in the direction indicated by the arrow on the cartridge.

Place the right hand end of the ribbon on the support bracket as shown below while you align the plastic tabs with the slots in the bracket. Then align and lower the left end of the ribbon onto the left support bracket until it snaps into place. When you do this, the ribbon fabric should lower into the area between the print head and the pins which support the metal nose shield. If the printer power is on, "Ribbon Installed" will be displayed as the ribbon is installed.

Ribbon Cartridge Installation.

Lower the ribbon loading bail as shown below. This automatically places the ribbon between the ribbon guides and the print head as the print head is placed back into the printing position.

Lowering (closing) Ribbon Loading Bail.

USING SPECIAL FEATURES

This section describes some of the features which are unique to FormsPro 4000 series printers. These features include instructional messages, which you may encounter when you change forms, options available for handling a paper out condition, and how to set the ribbon wear indicator to match how you use your printer. Also included are instructions for checking the printer configuration and for printing a list of setup information, including all of the form setup parameters.

UNLOADING AND SELECTING FORMS

When unloading forms, the printer may display the message "Too Much Paper", "Tear Off Paper", or "Finish Printing!". The cause and remedy for each message is described below.

"Too Much Paper"

This message is displayed when the UNLOAD button has been pressed and the printer senses that there is too much paper to unload reliably. The solution is to simply press FORM FEED to place the top of the next form at the tear bar for easy tearing, tear off any remaining form(s), and then proceed with the unload operation. Note that the printer unload up to 36 inches of paper before displaying the error message, so it may be desirable to press FORM FEED enough times to ensure that there are no partially printed forms left in the printer.

"Tear Off Paper"

This message is displayed when an escape sequence is used to select a new form and the printer senses that there was a form already past the tear bar. When this occurs, the paper will automatically be placed back to the position it was at before the escape sequence was processed. To clear this condition, tear off the form(s) (you may need to press FORM FEED, if the previous form was not completed) and place the printer back online. For more information about loading different forms with escape sequences, refer to the FormsPro 4000 Series Programmer's Manual. The Programmer's Manual may be obtained by returning the form packed with the printer.

"Finish Printing!"

This message is displayed when a form has been unloaded, the FORM SELECT button has been pressed and there is a partial line in the print buffer which may belong on the actual form that is being unloaded. This condition may occur if the host computer has sent part of a line, but has not terminated it with a Carriage Return, Line Feed, etc. To allow the printer to finish this line and/or form, simply press LOAD to reload the form and press ONLINE to allow the printer to complete the form.

If you do not wish to finish printing this line/form, you may force the printer to delete this partial line from its buffer by pressing and holding the UNLOAD/FORM SELECT button through the following series of messages. When the printer displays "Finish Printing!", continue to hold the button. After two seconds the printer will display "Cancel Printing?". Continue to hold the button for two more seconds and the printer will display "Print Canceled". Now release the button and you may change the paper, or you may press the FORM SELECT button to select another form.

HANDLING A PAPER ERROR CONDITION

Paper errors may be caused by either a paper out or a paper jam. The printer will deal with a paper error condition in one of two ways. The factory default method is described below under "Standard Paper Out Handling". For a description of how paper errors are handled when Page Reprint is enabled, refer to "Handling Paper Errors With Page Reprint Enabled" in the " Page Reprint" section that follows.

Standard Paper Error Handling

The standard way of dealing with a paper error is that printing will stop and the printer will go off line as soon as a paper error condition is detected. In the case of paper out, the paper will be ejected from the tractors. Printing will continue at the top of the next form when it is loaded.

PAGE REPRINT

Page Reprint is a feature which may be used to reprint a page in its entirety after a paper error occurs, rather than just resuming printing as described above. This may be used when you are printing on preprinted forms to prevent splitting one form's data onto two separate pages.

Please read through all of the following topics concerning Page Reprint to make sure you wish to use it before you enable it.

Enabling Page Reprint

To enable page reprint, first take the printer off-line. Press and hold the SETUP button until "Setup: INTERFACE" is displayed. Then press the FUNCTION UP button until "Fault:" is displayed. Now press a VALUE button to select "Reprint Pg". You must now set the page size as described below.

Setting the Reprint Page Size

After you select reprint page, press the FUNCTION UP button to display "Page Size:". Before you use the VALUE buttons to select the page size, please read the following discussion, which describes the available values.

Page size is set in increments of 256 characters. Ideally, the specified page size should be as large as the largest page to be printed on any form. This includes non-printing characters such as spaces, tabs, carriage returns, and line feeds. If the page size is not set large enough, it will not be possible to reprint the page. If the size is large enough, the message "Reprinting Page!" will be displayed after paper is loaded and the printer is placed back on-line. If the size is not large enough, the printer will display "Cannot Reprint!" and will continue printing just as though the reprint option is not enabled.

The buffer space for the page reprint is taken from the I/O buffer, so do not set the page size unnecessarily large. The standard buffer size is 4096 characters. A buffer expansion option is available which will increase the I/O buffer to a total of 28672 characters. At least 512 characters must be left allocated to the I/O buffer when you set the page size. Maximum page sizes are 3584 characters and 28160 characters. The buffer expansion option is recommended if page reprint is to be used, since it will allow a larger page size and still retain a reasonable I/O buffer size.

Handling Paper Errors With Page Reprint Enabled

When a paper error occurs during printing, just load more paper and place the printer back on line. The printer will sound the bell and display "Reprinting Page!". Place the printer back on-line and the printer will print the current form in its entirety and continue printing subsequent pages.

Another feature of Page Reprint is the ability to save a form if printing begins and the wrong form was accidentally selected. If this occurs, quickly take the printer off-line before the first page finishes printing. Do not press FORM FEED. Pressing FORM FEED will cause the current page to be "completed", which will remove it from the reprint buffer and cause that much of the form to be lost. Instead, unload the form and load the correct form. The bell will beep and "Reprinting Page!" will be displayed. Place the printer on-line to reprint the first page and continue printing subsequent pages.

Using Escape Sequences With Page Reprint Enabled

To reprint a page, the printer performs a carriage return at the top of the newly loaded form, and then reprocesses all data received for the incomplete page. If escape sequences have been used in the partially printed page, the printer may be left in a different state than when the page began printing originally.

Escape sequences may be used successfully with page reprint, if you are careful. At the beginning of each page, escape sequences should be sent to reset any default attributes that may have changed. This will insure that reprinted pages look the same as they would have on the first printing. For example, assume that the printer is set for normal print. Part way through the page, an escape sequence is used to select bold print. If it is necessary to reprint the page at this point, the beginning of the page will be reprinted in bold because bold was never turned off. The problem may be avoided by sending an escape sequence to turn bold off at the beginning of the page (even though it is already off under normal circumstances).

For more information on using escape sequences, refer to the FormsPro 4000 Series Programmer's Manual.

USING THE RIBBON CHECK FEATURE

The use of PRINTEK brand ribbons (Printek part number 90481) provides a number of benefits in the use of your FormsPro 4000 series printers. First of all Printek ribbons offer a 23,000,000 draft character life, substantially more than that of most imitations. The specially formulated ink also provides the best lubrication for the print head and thus the longest print head life. Be sure to insist on genuine Printek ribbons.

Using Printek brand ribbons also allows the printer's ribbon checking feature to operate. The ribbon checking feature will insure that your printer does not try to print when there is no ribbon installed which could result in the loss of valuable data.

Matching the Ribbon Wear Indicator to Printer Use

The ribbon checking feature also will keep track of the number of draft characters (or draft equivalent characters if printing other fonts or graphics) that have been printed since the ribbon was last installed. Once the specified number of draft equivalent characters has been printed (factory preset to 23,000,000), the printer will begin to flash "Change Ribbon" on the LCD display. Printing will not be interrupted, but the message will continue to flash until the ribbon is changed.

Your particular printing application may dictate that you change the ribbon after more or less than fifteen million characters. If you wish to receive the Change Ribbon message after a different amount of usage, you may change the number of draft equivalent characters to be counted in the "Ribbon Life" function in the "Setup: OPTIONS" menu. See the appendix on Advanced Control Panel Features.

Turning Off Ribbon Checking

You may wish to turn off the ribbon checking feature for one of two reasons. First of all, you may not wish to receive the "Change Ribbon" message. Secondly, you must turn off this feature if you wish to use non-Printek brand ribbons in your printer. If you want to turn this feature off, set the "Ribbon Check:" function in the "Setup: OPTIONS" to "No". For more information, refer to the "Advanced Control Panel Features" appendix.

CHECKING SETUP CONFIGURATION

Certain configuration settings, installed options, firmware versions, and other information may be viewed on the front panel LCD. To cause this information to be displayed, turn off the power switch on the side of the printer, and then press and hold the ONLINE button while you turn the power switch back on. Continue to hold the ONLINE button until "FormsPro 4300", "FormsPro 4500", or "FormsPro 4503" is displayed on the front panel. You may now release the button as the printer continues to show configuration information, and then proceed with the normal power up process.

PRINTING SETUP INFORMATION

Part or all of the setup configuration information may be printed. To do so, turn off the power switch on the side of the printer, then press and hold the SETUP button while you turn the power switch back on. The printer will display the message "Print SETUP?". Continuing to hold the SETUP button will cause the printer to print a list of options installed, certain hardware adjustment values, the firmware versions, and all values set for the currently selected form. If you are still holding the SETUP button, the printer will display "Print All Forms?". Continuing to hold the SETUP button will cause the printer to print the setup values for all ten forms. Once this begins to print, you may release the SETUP button.

This information may prove to be helpful if forms or interface settings are accidentally changed. This information can also be helpful if you need to call your dealer, distributor, or Printek Technical Support or Customer Service for assistance or repair.

PARKING THE FORMSPRO 4503 TRACTORS FOR SHIPMENT

In the event the printer ever needs to be shipped, the tractors should be "parked" toward the front of the unit. To accomplish this, first remove the forms from all three tractor paths. Then turn off the power switch on the side of the printer. Now press and hold the UNLOAD button while you turn the power switch back on. Continue to hold the UNLOAD button until the message "Park Shuttle ..." is displayed. After the shuttle stops moving and the park shuttle message is no longer displayed, turn off the power switch and prepare the unit for shipping.

IN CASE OF DIFFICULTY

INTRODUCTION

A list is provided below which includes symptoms of possible problems and corresponding causes and/or remedies. If you encounter a problem which you cannot solve with the information in the following list, the company that sold you the printer can provide you with local technical assistance and/or repairs. If you need further assistance, please contact Printek, Inc. at 800-DOT-INFO (800-368-4636) and ask for "Customer Service" to obtain the name of an authorized service center in your area, or to obtain factory repairs. DO NOT send your printer to Printek, Inc. without first obtaining a Return Authorization number from Printek's Customer Service department. When calling, please have available the name of the company who sold you the printer, the date of purchase, the printer model number, the printer serial number, and a list of any installed options (see option list on the back of your printer). Also provide as much information as possible about the problem. If you return your printer for repair, it is helpful if you can also return a print sample of the error if applicable.

Many authorized dealers, distributors, and service centers offer service contracts which provide for the fastest possible repair for your printer. Printek, Inc. also provides several types of factory level service contracts ranging from guaranteed 48 hour turnaround, to a replacement printer shipped to you within 24 hours. For more information, contact the company where you purchased the unit or contact Printek Customer Service at the above toll free number.

SYMPTOMS AND POSSIBLE CAUSES

Problem or Symptom	Possible Cause or Remedy
Green POWER LED does not come on when the printer is switched on.	Power cord is not plugged into the wall outlet or the printer. No power at the wall outlet. Printer AC power fuse is blown (see "Replacing the AC Power Fuse" later in this chapter).

Problem or Symptom	Possible Cause or Remedy
"No/Wrong Ribbon" message is displayed when a ribbon cartridge is actually installed.	The battery in the ribbon sensing circuit may need to be replaced (normal battery life exceeds ten years).
	A non-Printek ribbon has been installed. While not recommended, the use of non-Printek ribbons is allowed. However, only Printek ribbons will allow the ribbon sensing system and ribbon wear indicator to function. To configure your printer to be able to use non-Printek ribbons, refer to the appendix titled "Advanced Control Panel Features".
Poor print quality.	Worn or damaged ribbon.
	Ribbon not installed properly on drive mechanism.
	Note: If the ribbon cartridge and/or fabric is damaged, replace it with a new ribbon. Continued use of a damaged ribbon may cause damage to the ribbon drive mechanism or the print head.
Poor print quality on multipart forms.	The form requires the high impact character mode. Set Impact to High in the form setup menu.
	Poor carbon or carbonless form quality. Refer to "Selecting a Quality Form" later in this section.
Paper misfeeds.	Obstruction in paper path. Check both printer and print stand.
	Torn or ragged edge on paper.
	Paper misaligned in tractors.
	Left and right tractors too close to each other allowing paper to "droop".
	Tractor doors not closed.
	Paper too difficult to pull from box (dragging on sides of box). Remove forms from box or cut away sides of box.
	Tractor blocking paper out detector.
	Poorly constructed forms. Refer to "Selecting a Quality Form" later in this section.
"MP: I/O Overflow" error message.	The printer's input buffer has been exceeded. Check the interface setup to assure that the handshaking or flow control method required by your computer has been selected. Also check the cabling for proper pin-out or broken wires.

Problem or Symptom	Possible Cause or Remedy
"MP: Parity Error" error message.	A serial character was received with improper parity. Check the interface setup to assure that the parity (odd, even, ignored, or none) is set to match the parity setting required by your computer. Also check the cabling for intermittent connections
"PE: Head Stall" error message.	Carriage path is obstructed. Clear the obstruction and turn the printer off and back on again to clear the error.
	Carriage shaft is dirty. Wipe completely with a clean cloth.
	Ribbon cartridge is worn or damaged and will not advance ribbon.
Other MP: or PE: error message.	The printer has detected an internal error condition. Report the message to an authorized service agent.
Will print barberpole, but will not print data from the computer.	The interface is not configured properly. Refer to the "Operation" section and review the interface settings to make sure they match what is being generated by the computer.
	The interface cable is not wired properly. Refer to the appropriate section or appendix for pin-out specifications for the interface being used.
Paper drops out of the tractors during load.	The paper out sensor is blocked. This may be caused by paper that is extending above the tractors in another path or a tractor that is blocking the paper out detector.

USING THE HEX DUMP MODE

The Hex Dump mode provides a way to print, in a readable form, all of the data received by the printer. This tool is often useful to programmers for diagnosing problems encountered when sending the printer control codes and escape sequences used to control the various print modes and setup features of the printer. Hex Dump may also be used to detect what commands are being sent by a particular software application to help determine which emulation mode is needed for that application.

To select Hex Dump, refer to the "Operation" section and review the information about setting the emulation mode ("Mode:") in the interface menu. Be sure to note the emulation currently being used before you change it to Hex Dump.

A sample Hex Dump is shown below. Note that each line shows sixteen characters, first in hexadecimal format, then in printable ASCII format. All unprintable ASCII characters (printable characters are from 21 hex to 7E hex inclusive) are represented by a period.

```
54686973  20697320  61207361  6D706C65  This.is.a.sample
20686578  2064756D  7020746F  20696C6C  .hex.dump.to.ill
75737472  61746520  68657820  64756D70  ustrate.hex.dump
666F726D  61740D0A                      format..
```

When the printer executes in hex dump mode, control characters and escape sequences sent to the printer are not recognized or processed. The hexadecimal representation of the control characters and escape sequences appears in the hex dump, but no special processing occurs.

In particular, note that ETX/ACK handshake will not operate properly in hex dump mode. When an ETX is received by the printer, its hexadecimal representation is printed in the hex dump, but no ACK is sent to the host computer. When you use the printer in hex dump mode, we recommend that you configure the printer for parallel I/O, serial I/O with hardware handshake, serial I/O with XON/XOFF handshake, or CX/TX if installed.

To exit hex dump, use setup to return the printer to the previous emulation mode.

SELECTING A QUALITY FORM

Although the FormsPro 4000 series printers have been designed to handle difficult forms, you may come across a form that does not feed reliably or provide adequate print quality on all copies.

One of the main causes of paper misfeeds is a form that is "tented". Tenting is a tent-like bulge at the perforation when forms are unfolded from the box. The printer allows a maximum form thickness of .025 inches, which a badly tented form may exceed.

Tenting is usually caused by glue drying on the perforation after the forms maker puts the forms into the box, or forms which are not glued at all. Forms with solid glue lines which run vertically down the entire form are the most susceptible. If you experience such a problem, request "interrupted glue line" forms from your vendor. This method stops the glue approximately three-quarters of the way down the form and then resumes gluing at the top of the next form. The gluing should not begin too far below the top of the form or pages of the form will be able to fan apart and be a potential cause of jamming.

Another area where not all forms are alike is in the quality of carbon paper used, or in the way carbonless inks are applied. If the back copies of your form are too light, request a quick-release carbon or a higher quality carbonless inking method.

REPLACING THE AC POWER FUSE

Use the following procedure to replace the fuse if it should ever become necessary:

1. Unplug the line cord from the back of the printer.

2. Use a phillips screwdriver to remove the two black screws that are located just above the line cord socket.

3. Open the case like you would normally do when you load paper.

4. As viewed from the front of the printer, locate the AC cover in the right rear corner of the chassis. Then remove the screw that secures the cover to the bottom of the chassis.

5. Carefully remove the AC cover to expose the AC wiring.

6. Carefully remove the fuse from the filter circuit board. Be careful not to damage the fuse mounting clips.

7. For continued protection from the risk of fire or damage to the printer, replace the fuse only with the same type fuse. Refer to the label on the AC cover for information about the fuse.

8. Reposition the AC cover over the AC wiring. Be careful not to pinch any wires between the cover and the chassis. Then reinstall the three screws.

9. Reconnect the line cord to its socket on the rear of the printer.

The printer is now ready to be put back into service.

APPENDIX A”

ADVANCED CONTROL PANEL FEATURES

The printer's control panel has two additional menus for use by the system administrator. These are the “Setup: OPTIONS” and “Setup: SECURITY” menus. The OPTIONS menu is used to inform the printer of any “over all” operating variables and of some optional products which may be installed.

Setup: OPTIONS

The option menu is the third setup menu. To enter it, first take the printer offline. Then press and hold the setup button for approximately 4-1/2 seconds until “Setup: OPTIONS” appears on the display and the bell beeps three times. Note that while you hold the button, “Setup: FORMS” and “Setup: INTERFACE” are displayed as you pass through those menus. At this time you are able to view and/or edit the values for the option functions listed below. Although you may select functions with either the FUNCTION UP or FUNCTION DOWN buttons, they are listed here in the order of function up.

Function	Possible Values	Description
Max Form #:	0 through 9	Sets the last form number to be displayed for operator selection with the FORM SELECT button or while in the “Setup: FORMS” menu. Note that when setting this value that you may not select a value less than the form currently selected when setup was entered, or less than the form currently selected in the “Setup: FORMS” menu.

Function	Possible Values	Description
Ribbon Check:	On* or Off	Sets whether or not ribbon checking is active. Turning this off may limit the warranty on the print head. For more information, see the chapter on "Using Special Features" and refer to the warranty information in the "Printer Specifications" appendix.
Ribbon Life:	15*, 5 - 30	Sets the number of characters to be printed before the "Change Ribbon" message is displayed. For more information, see the chapter on "Using Special Features".
Paper Cutter:	Yes or No*	Sets whether or not the optional FormsCutter is installed.
Imager:	Yes or No*	Sets whether the Imager or Imager Plus is installed.
Translation:	Off* or On	This function is only available when an Imager option is installed. For more information, refer to the Imager manual.
Free Format:	Off* or On	This function is only available when an Imager option is installed. For more information, refer to the Imager manual.
Terminator:	LF* or CR	This function is only available when an Imager option is installed. For more information, refer to the Imager manual.
Ignore Char:	Off* or On	This function is only available when an Imager option is installed. For more information, refer to the Imager manual.
Zero:	Normal or Slashed*	This function is only available when an Imager option is installed. For more information, refer to the Imager manual.

Function	Possible Values	Description
Ignore Col 1:	Yes or No*	This function is only available when an Imager option is installed. For more information, refer to the Imager manual.
Control Char:	^*, ~, !, ?, ;, ', |, or \	This function is only available when an Imager option is installed. For more information, refer to the Imager manual.
Bar Codes:	Hi-Res*, Med-Res, Lo-Res	This function is only available when an Imager option is installed. For more information, refer to the Imager manual.

Setup: SECURITY

This menu offers a security feature for environments where it is not desirable for the operator to be able to modify either the values of form related functions, interface related functions, or option related functions. With the security feature enabled, the operator will be able to inspect or view the values of the various functions, but will not be able to change or edit these values.

The security menu is the fourth setup menu. To enter it, first place the printer offline. Then press and hold the setup button for approximately 8-1/2 seconds until "Setup: SECURITY" appears on the display and the bell beeps four times. Note that while you hold the button, "Setup: FORMS", "Setup: INTERFACE", and "Setup: OPTIONS" are displayed as you pass through those menus. At this time you are able to view and/or edit the values for the security functions listed below. Although you may select functions with either the FUNCTION UP or FUNCTION DOWN buttons, they are listed here in the order of function up.

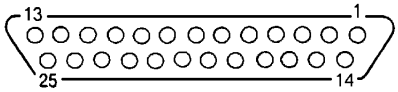
Function	Possible Values	Description
Forms:	Edit*, View, or Init	Selects whether an operator can modify, only look at, or initialize function values in the forms menu. Edit allows the operator to look at and/or modify form function values. View allows the operator to only look at form function values. No values can be modifed. Init causes all form function values to be set to the factory default settings for all forms. When this completes, the security value is set to Edit.

Function	Possible Values	Description
Interface:	Edit*, View, or Init	Selects whether an operator can modify, only look at, or initialize function values in the interface menu. Edit allows the operator to look at and/or modify interface function values. View allows the operator to only look at the interface function values. No values can be modified. Init causes all interface function values to be set to the factory default settings. When this completes, the security value is set to Edit.
Options:	Edit*, View, or Init	Selects whether an operator can modify, only look at, or initialize function values in the options menu. Edit allows the operator to look at and/or modify option function values. View allows the operator to only look at option function values. No values can be modifed. Init causes all option function values to be set to the factory default settings. When this completes, the security value is set to Edit.
Clone:	Off*, Transmit, Receive	Used for cloning setup information to or from a printer. For more information, see the appendix on "Cloning Printer Setup".

APPENDIX B

OPTIONAL RS-422 INTERFACE

A 25-pin female "D" type connector is located on the rear of the printer above the power connector. Connect a shielded cable between your computer and this connector. The pin-out for this connector is shown below.



Pin	Signal
7	Ground
9	RI+ Receive Data.
10	RI- Receive Data.
11	DO+ Transmit Data.
12	DO- Transmit Data.

RS-422 Serial Interface Connector

To configure your printer for serial data, more information is required than for some other interfaces. In particular, you must know the baud rate, the number of data bits, the type of parity checking, and the handshaking or flow control method required by your computer. Check your computer manual or contact your computer dealer for this information.

Turn the printer on and enter the interface menu as described in the "Installation and Quick Setup" section. Press the FUNCTION UP button to display "I/O: *n*". Then press the VALUE UP button until "*n*" is "Serial".

The factory default values for the RS-422 serial configuration are 9600 baud, 8 data bits, no parity, XON/XOFF handshake enabled, and ETX/ACK handshake disabled. If your computer requires you to change any of these parameters, please refer to "Entering the Interface Setup Menu" in the "Operation" section of this manual. Otherwise, simply press SETUP again to exit the setup mode and reset the printer. The serial interface with the above parameters is now active.

APPENDIX C

OPTIONAL COAXIAL/TWINAXIAL INTERFACE

This appendix describes the configuration of the optional coaxial/twinaxial interface which replaces the standard parallel interface. The factory default settings in the Interface setup menu are Mode: Epson, I/O: CX/TX, and Data Bits: 8.

For your convenience, a parallel interface is also provided as part of the coaxial/twinaxial interface. The interface will automatically switch to receive data from either the coaxial/twinaxial port or the parallel port, after the timeout specified on the configuration DIP switches (SW1-7 & SW1-8). When data is received at the coaxial/twinaxial port, the interface will automatically switch to Printek emulation and select the EBCDIC font. The interface will automatically switch the printer to the default emulation selected in the Interface menu and select the parameters set for the current form in the Forms menu when data is received at the parallel port. For information about changing emulations and/or how to command other special printer functions via software control sequences, refer to the Programmer's Manual.

This interface is supplied with two connector cables. One cable provides a BNC type connector for coaxial connection. The other cable is a “smart T” for twinaxial connections, and automatically provides line termination if you have only one twinaxial cable connected. The interface also configures itself automatically for either coaxial or twinaxial operation, depending upon which of the above cables is attached to the 15 pin “D” connector. Some of the configuration DIP switches will also have different meanings depending upon which cable is attached. Refer to the following coaxial or twinaxial section as appropriate for these switch definitions and other configuration information.

COAXIAL OPERATION

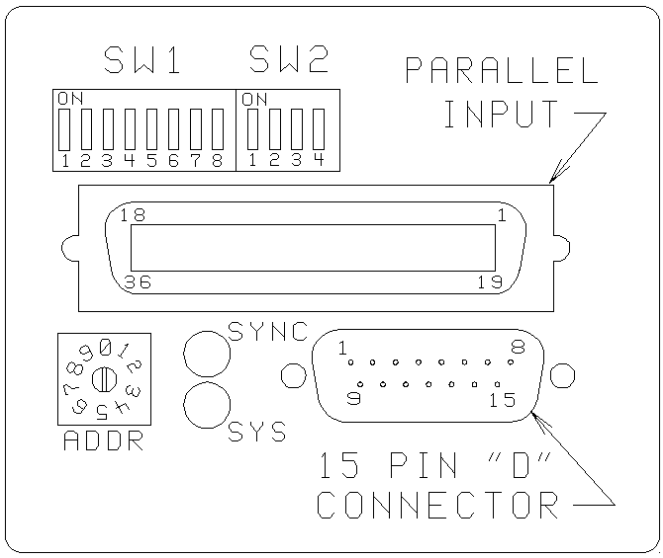
This interface automatically configures itself for coaxial operation if the 15 pin “D” to BNC adapter cable is plugged in when power is applied to the printer.

The coaxial interface allows you to attach a FormsPro 4000 series printer to IBM mainframes via 3274, 3276, or 3174 Cluster Controllers, and emulates either the IBM 3287 or 3262 printer. This interface supports the three types of data transmitted from the Cluster Controller. These types are dependent upon the controller type, the system configuration, and the type of communication used. The types are:

DSC (Data Stream Compatible) 3270 type LU3
DSE (Data Stream Emulation) SNA type LU3
SCS (SNA Character Stream) SNA type LU1

In the DSC/DSE type LU3 mode, both formatted and unformatted data streams are supported.

Interface diagnostics are available at the end of this appendix in the section titled "Coaxial/Twinaxial Interface Diagnostics".



CX/TX Interface.

Option Switches When Configured for Coaxial Operation

The dipswitches as shown above have the following meanings when the interface is configured for coaxial operation. An asterisk (*) indicates the factory default setting.

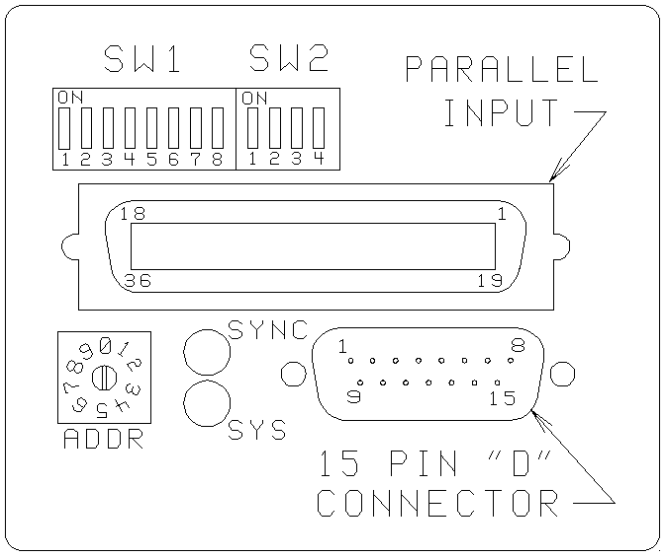
Switch/Position	Function
SW1-1 OFF*	Select IBM 3287 Emulation.
SW1-1 ON	Select IBM 3262 Emulation.
SW1-2 OFF*	Reserved for future use.
SW1-3 OFF*	Reserved for factory use.
SW1-4 OFF*	Reserved for factory use.
SW1-5 OFF*	Set default Maximum Print Position to 132 columns.
SW1-5 ON	Set default Maximum Print Position to none.

SW1-6 OFF*	Set default Maximum Print Line to none.
SW1-6 ON	Set default Maximum Print Line to 66 lines.
SW1-7 SW1-8	Parallel multiplexer timeout.
OFF* OFF*	Short (15 seconds)
ON OFF	Medium.
OFF ON	Long.
ON ON	Very Long (60 seconds).
SW2-1 OFF*	Run. Addr 0 = Logical Buffer Size is 1920. Addr 1 = Logical Buffer Size is 960. Addr 2 = Logical Buffer Size is 1920. Addr 3 = Logical Buffer Size is 2560. Addr 4= Logical Buffer Size is 3440. Addr 5 = Logical Buffer Size is 3864. Addr 6 = Logical Buffer Size is 1920. Addr 7-9 = n/a.
SW2-1 ON	Test. Addr 0-6 = Code Dump. Addr 7 = Configuration Printout. Addr 8 = Print Test. Addr 9 = Loop Test.
SW2-2 OFF*	Send 5E Hex (^) for Logical Not.
SW2-2 ON	Send E1 Hex ( ) for Logical Not.
SW2-3 OFF*	Enable Null Line Suppression in LU3 Formatted Mode.
SW2-3 ON	Disable Null Line Suppression.
SW2-4 OFF*	Paper Errors Not Reported.
SW2-4 ON	Paper Errors Reported.

TWINAXIAL OPERATION

When you attach devices such as the FormsPro 4000 series printer to the System 3X, the devices must be configured onto the system by device type, so that they may be supported and used to their utmost ability. Once a device has been configured onto the system, the system utilizes the device type information to communicate with the device. The device responds to the system's polls and commands in accordance to its device description. The system being configured for a 4214 Model 01 printer, for example, as address 10 (port 1, device 0) will expect a response from a 4214 Model 01 at that address location. Should there be a 5256 Model 3 printer at device address 10 when the system sends a print job to the printer, the system would generate a "HARDWARE FAILURE" error message (for System 38) or a "PROGRAM ERROR" error message (for Systems 34/36). It is very important to observe the device and System 3X configurations.

The FormsPro 4000 series printers may emulate three different IBM models as listed in the following table. The DIP switches allow you to select these emulations. As shipped from the factory, the printer is set for 4214 Model 2 emulation.



CX/TX Interface.

Option Switches When Configured for Twinaxial Operation

The dipswitches as shown above have the following meanings when the interface is configured for twinaxial operation. An asterisk (*) indicates the factory default setting.

Switch/Position	Function
SW1-1 SW1-2	Select Emulation
OFF* OFF*	4214 Model 2.
ON OFF	5225 Model 3.
OFF ON	5256 Model 3
ON ON	Reserved for future use.
SW1-3 OFF*	Reserved for factory use.
SW1-4 OFF*	Reserved for factory use.
SW1-5 SW1-6	Default Character Set.
OFF* OFF*	Multinational.
ON OFF	U.S.A.
OFF ON	Austrian/German.
ON ON	French Canadian.
SW1-7 SW1-8	Parallel Multiplexer Timeout.
OFF* OFF*	Short (15 seconds).
ON OFF	Medium.
OFF ON	Long.
ON ON	Very Long (60 seconds).
SW2-1 OFF*	Run.
SW2-1 ON	Test. Addr 0-6 = Code Dump. Addr 7 = Configuration Printout. Addr 8 = Print Test. Addr 9 = Loop Test.
SW2-2 OFF*	Send 5E Hex (^) for Logical Not.
SW2-2 ON	Send E1 Hex ( ) for Logical Not.
SW2-3 OFF*	Load Forms Enabled.
SW2-3 ON	Load Forms Disabled.
SW2-4 OFF*	Reserved for future use.

Twinaxial Address Switch

The "ADDR" switch sets the logical device address. You may wish to use a small screwdriver to turn the knob on this switch. Note that there is a black line on the side of this knob which indicates the address that is currently selected. Only addresses 0 through 6 are valid for twinaxial operation. Addresses 7, 8, and 9 are used for diagnostic purposes only and are described later in this appendix in the section titled "Coaxial/Twinaxial Interface Diagnostics".

Twinaxial Installation Preparation

When you attach a device to the System 3X cabling, be sure to observe the following:

1. A maximum of only seven devices can attach to a twinax port (addresses 0 through 6).

2. You cannot have duplicate addresses. For example: two devices with an address of 00.

3. The logical address does not have to correspond to the physical location of the device on the twinax line.

4. The printer emulation must match the device type for which the system is configured.

5. When you address a device, either at the device or configuring it onto the system, remember that the address is comprised of two parts; the first is the PORT to which the device is attached, and the second is the logical location of the device or the device address. For example: ADDRESS 10 means the device is on PORT 1 with the address of 0, this is the number dialed onto the address switch of the I/O on the printer.

6. As a precaution, have the print jobs placed ON HOLD and have the terminals SIGN OFF on the line that you are working on.

Getting On-line

This section will use the terms “Up Stream” and “Down Stream”. “Up Stream” describes a device that is physically located closer to the system on the twinax line. “Down Stream” describes a device physically located more distant from the system on the twinax line. For example, if this printer is the third device on the line, the immediate “up stream” device would be the second device on this line.

To put the printer on-line, perform the following steps:

Step 1 - Power down the printer.

Step 2 - If there are any active devices on the twinaxial line that the printer is going to be on, you must:

   a. Disable or remove the line termination on the device immediately up stream.

   b. Place on hold any active jobs or spool file entries for any down stream devices.

   c. Sign off any active down stream terminals and terminal type devices.

Step 3 - Observe the following and attach the twinax cable to the printer I/O:

a. If there is a device up stream from this printer, the twinaxial cable will originate at the "OUT" connector of that device. The other end of this cable attaches to either side of the "smart T" connector on the printer.

b. If this printer is the first or only device on this line (only one cable is attached to the printer), the "smart T" will automatically provide the proper termination for the cable.

Step 4 - Verify that the address setting for this device is correct. Be certain that no address on the line is duplicated. Remember that the black line on the side of the address knob indicates the current address. Only addresses 0 through 6 are valid.

Step 5 - Turn the printer ON.

Step 6 - To ensure that the printer is properly installed, run the "WORK STATION PRINTER TEST" from the IBM system according to the following instructions. If you incur any problems while attempting to run this test, please refer to the section on VERIFICATION PROBLEMS later in this appendix.

Access the terminal's SIGN ON screen. If this terminal is a 3180 or 3190, press the "ALT, TEST" keys; otherwise press "CMD, BACKSPACE" to access the "Prime Option" menu.

Perform the following steps to test the configuration:

a. Select option "2" on the Prime Option Menu, "Work Station Printer Verification", to run the IBM printer verification test.

b. Select this printer's ID number to run the test on this printer.

c. Select the number of times you wish to print the Work Station Verification Test. The possible selections are:

1 Print test 1 time.

2 Print test 2 times.

3 Print test 3 times.

4 Print test continuously.

d. Select option "C" on the Work Station Printer Verification menu, when you have finished printing the test. You will be returned to the "Prime Option Menu".

e. Select option "C" on the Prime Option Menu, "End", to EXIT the "Prime Option Menu".

Twinaxial Verification Problems

If any problems occurred during the printer verification test:

a. Verify that the printer has the correct address setting.

b. Verify that the address in the system configuration matches the address setting on the printer.

c. Verify that the device type in the system configuration is correct for the type of printer being emulated, such as: 4214, 5225, etc.

d. Verify that the cable to the device immediately up stream on the twinax line is correctly connected. That is, if there is an up stream device, does the cable from that device originate at the "OUT" connection.

e. Verify that the device immediately up stream is functioning properly.

f. Verify that the device immediately down stream is functioning properly.

g. Verify that the last device on the line is providing the proper line termination. Also make sure that the last device on the line is the only device providing termination.

If the problem remains after you have checked all of the above, you may use the diagnostics described in the following section to verify that the interface and printer are functioning properly. If you are still unable to complete the installation, contact your dealer or Printek Technical Support for assistance.

Note: If you make any changes to cables, switch settings or the configuration, power the printer down, pause, and then power the printer up again.

COAXIAL/TWINAXIAL INTERFACE DIAGNOSTICS

This interface has its own built-in diagnostic programs to help you verify that the printer is operating properly.

To use a diagnostic, first turn off the printer. Then select the desired diagnostic by setting the interface switch SW2-1 to the test position (ON) and select the desired test as described below with the address (ADDR) switch. Now power the printer back on.

When finished running diagnostics, be sure to power off the printer, set SW2-1 to the run position (OFF), select the proper address for your installation (if configured for twinaxial operation), and power the printer back on.

Code Dump Mode (Address 0 through 6)

The code dump diagnostic allows you to print in hexadecimal format all data received by the coaxial/twinaxial interface.

First line - The printable representation of the received EBCDIC character. Unprintable characters (such as form feeds or nulls) will print as spaces.

Second line - The most significant nibble of the received EBCDIC character printed in hexadecimal format.

Third line - The least significant nibble of the received EBCDIC character printed in hexadecimal format.

For Example:

```
   F   K     A  H    D EBCDIC character received
02C002D02002C02C0403C0 Most significant nibble
CB629B2490FB11B8301441 Least significant nibble
```

This above example shows the printer receiving a Form Feed (0C) followed by a system command to go to 8 lpi (2B C6 02 09).

Configuration Printout (Address 7)

This diagnostic provides you with a one page printout which describes the current configuration.

Print Test (Address 8)

Selecting this diagnostic causes a test pattern to be printed. This tests the internal interface to printer electronics connections.

Loop Test (Address 9)

This diagnostic tests the internal interface electronics. When performing this test, the coaxial or twinaxial adapter cable must be attached to the printer, but not connected to the host computer. When complete, a “Loop test passed” or “Loop test failed” message will be printed.

Diagnostic Problems Checklist

If the printer's built-in diagnostic tests do not perform as described above then:

a. Verify the printer configuration.

b. Check all of the installation connections.

c. Rerun the diagnostic. If the problem persists, contact your dealer or Printek Technical Support for technical assistance. If possible, have the configuration printout from the Address 7 diagnostic available when you call.

APPENDIX D

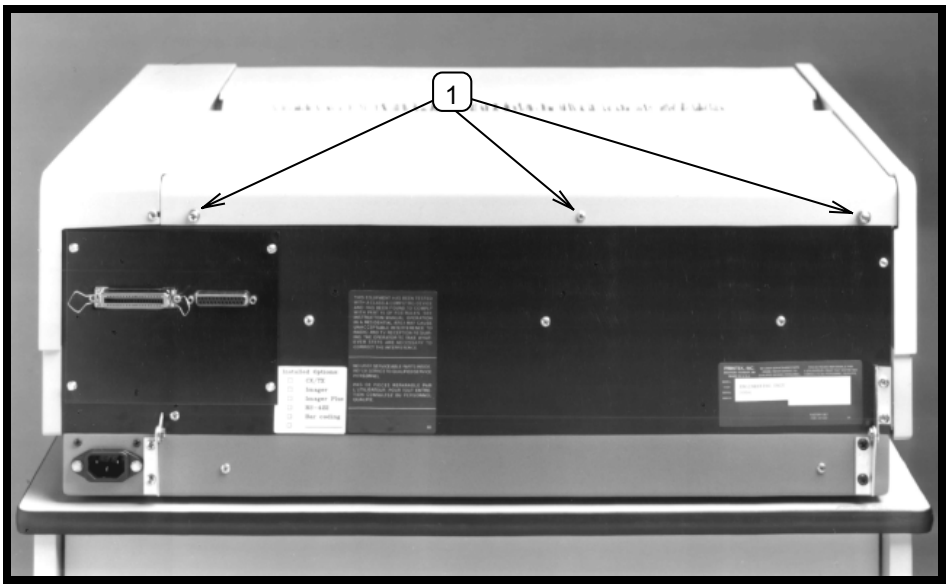
OPTIONAL BUFFER EXPANSION

The FormsPro 4000 series printers are available with an optional buffer expansion that increases the input buffer from 4K to 28K characters. This option can be installed either at the factory or in the field. Field installation, as described below, should be performed only by qualified service personnel. For installation, please contact the company who sold you the printer or contact Printek, Inc. Customer Service at 800-368-4636 for the name of the authorized service center nearest you.

CAUTION: The buffer IC as well as other components of the printer can be damaged by static electricity. When you install this option, try to do so in an uncarpeted area if possible. Before touching the printer electronics, touch the metal case of the printer to discharge any static charge you may be carrying.

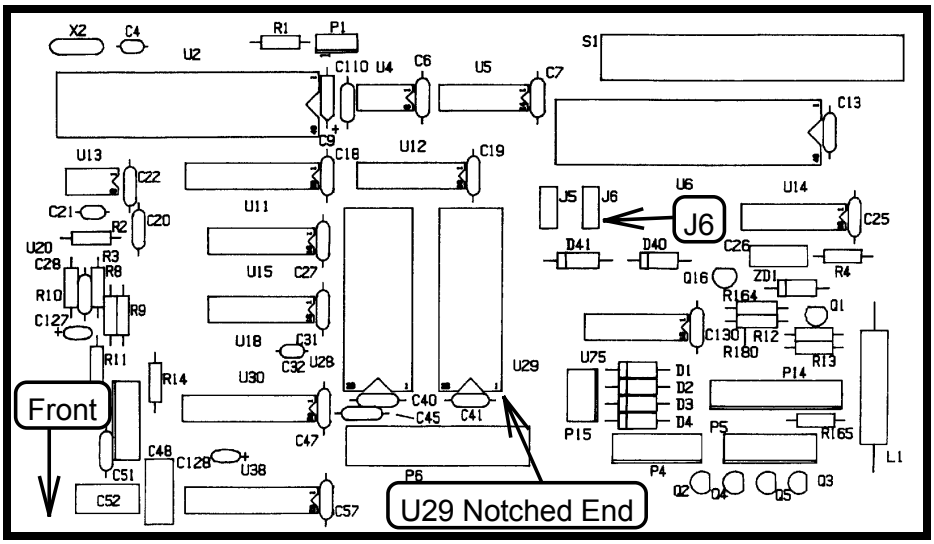
1. Turn the printer off.

2. Remove the three screws on the rear of the unit that secure the top cover in place. Then slide the top cover out of the back of the printer to expose the main circuit board.



1. Electronics Cover Screws.

3. Locate the memory IC at U29 and its associated jumper at J6. Note the orientation of the notch on the end of the IC at U29 and the location of the shorting plug at J6.



Buffer and Jumper Locations on Main Circuit Board

4. Remove the IC at U29 and replace it with the one supplied with the upgrade kit. Be sure that the notch is oriented the same as the one just removed (notched end toward the front of the printer). Also be careful not to bend any of the pins on the IC while installing it into the socket.

5. Move the shorting plug at J6 from its location on pins 2 & 3 to pins 1 & 2 (pin 1 is toward the front of the printer).

6. Reinstall the lid and screws.

7. Turn the printer on. If the installation was performed incorrectly, "MP: Bad RAM Chip" will be displayed on the LCD display. If this error occurs, inspect the IC for any bent pins and inspect the shorting plug for proper installation.

8. Indicate on the Installed Options label on the rear of the printer that the buffer expansion has been installed.

APPENDIX E

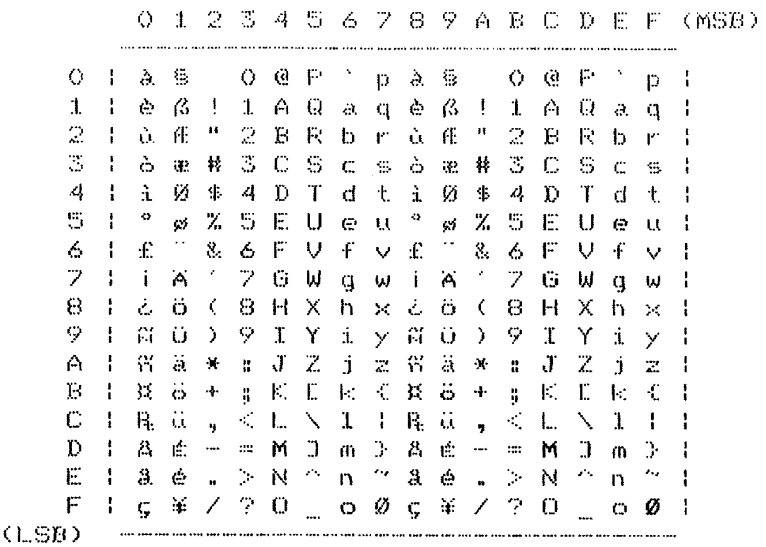
ASCII CHARACTER TABLES

ASCII CONTROL CODE DEFINITIONS

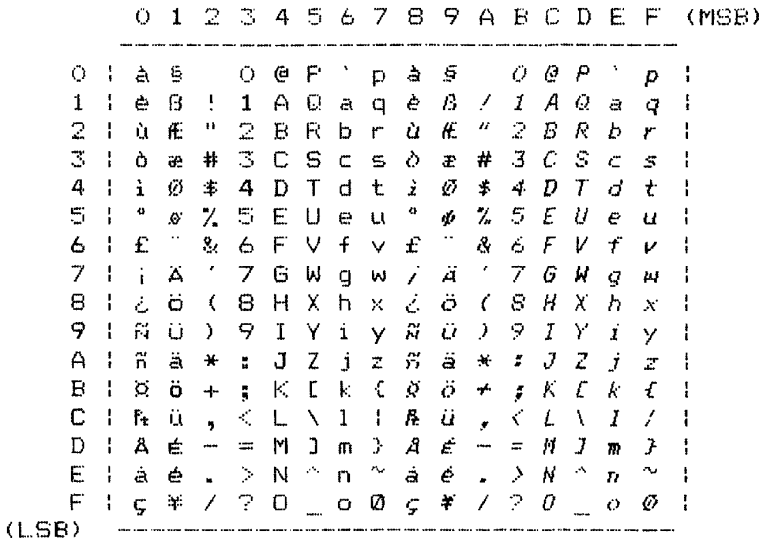
The following table is provided as a reference to the control character descriptions as provided by the ASCII definition. Not all of these definitions are supported by the FormsPro 4000 series printers and some are emulation dependent. For more information, refer to the Programmer's Manual.

Control Code	Hexadecimal Value	Description
NUL	00	Null
SOH	01	Start of Heading
STX	02	Start of Text
ETX	03	End of Text
EOT	04	End of Transmission
ENQ	05	Enquiry
ACK	06	Acknowledge
BEL	07	Bell
BS	08	Backspace
HT	09	Horizontal Tabulation
LF	0A	Line Feed
VT	0B	Vertical Tabulation
FF	0C	Form Feed
CR	0D	Carriage Return
SO	0E	Shift Out
SI	0F	Shift In
DLE	10	Data Link Escape
DC1	11	Device Control 1 (XON)
DC2	12	Device Control 2
DC3	13	Device Control 3 (XOFF)
DC4	14	Device Control 4
NAK	15	Negative Acknowledge
SYN	16	Synchronous Idle
ETB	17	End of Transmission Block
CAN	18	Cancel
EM	19	End of Medium
SUB	1A	Substitute
ESC	1B	Escape
FS	1C	File Separator
GS	1D	Group Separator
RS	1E	Record Separator
US	1F	Unit Separator

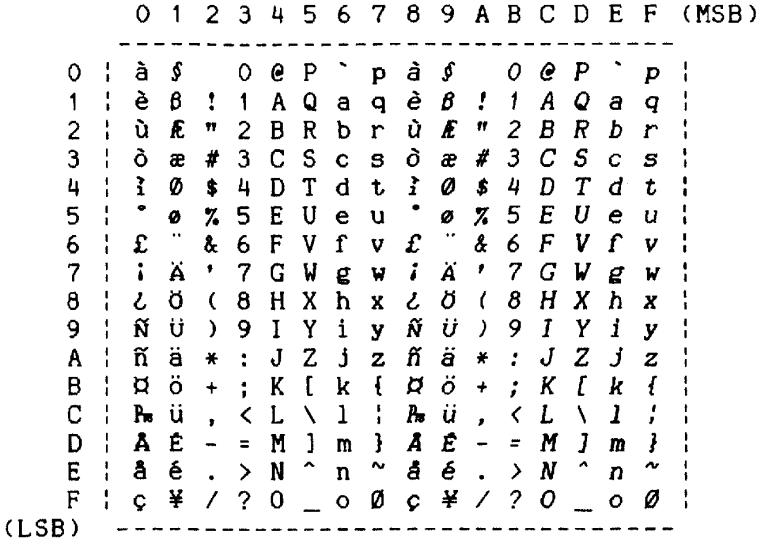
Epson FX Fast Draft

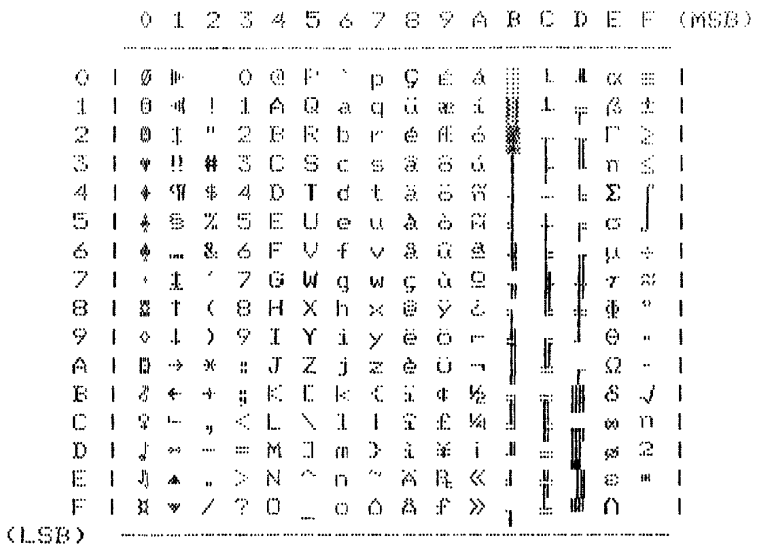


Epson FX Draft

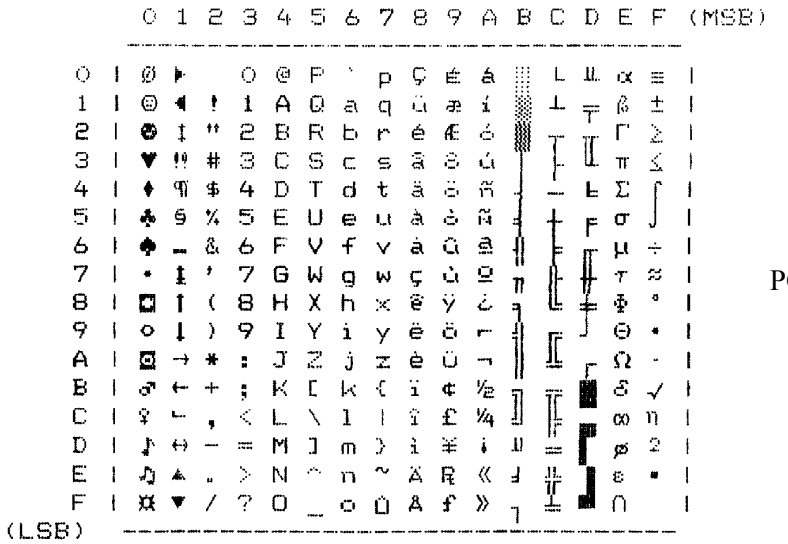


Epson FX Letter Quality

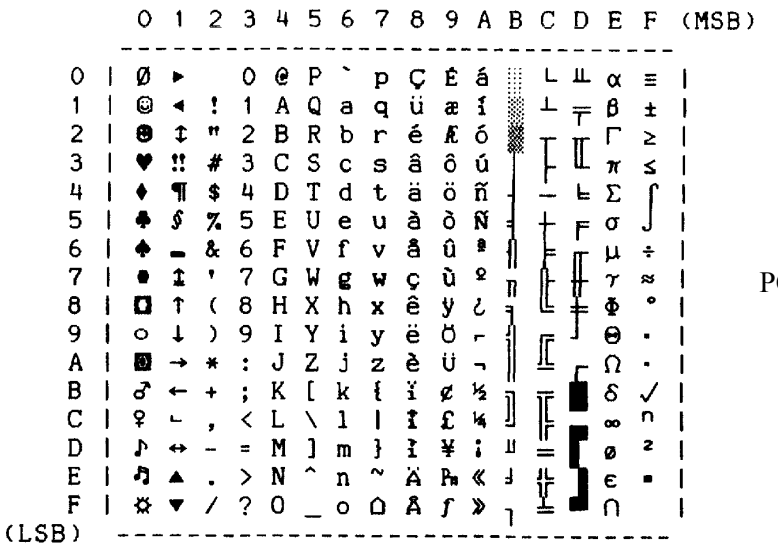




PC Fast Draft

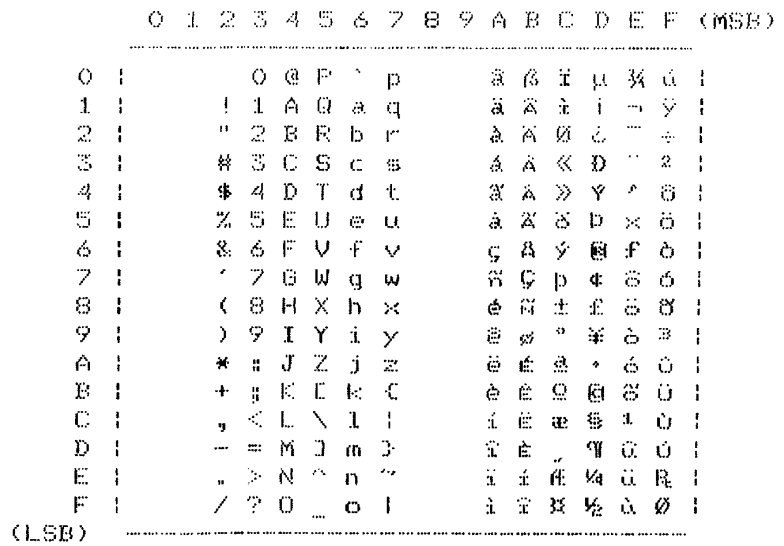


PC Draft

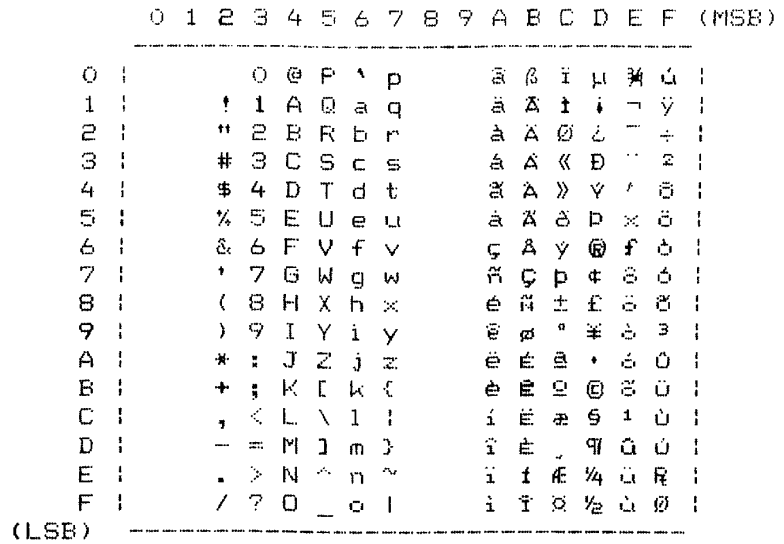


PC Letter Quality

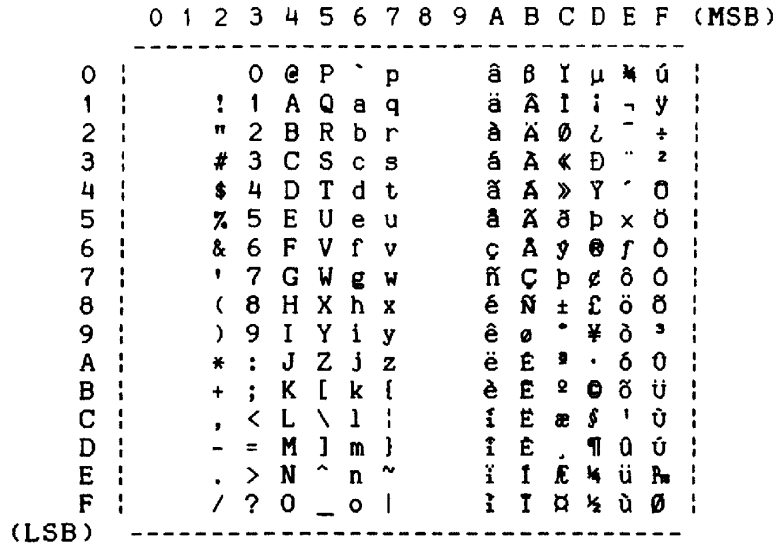
EBCDIC Fast Draft

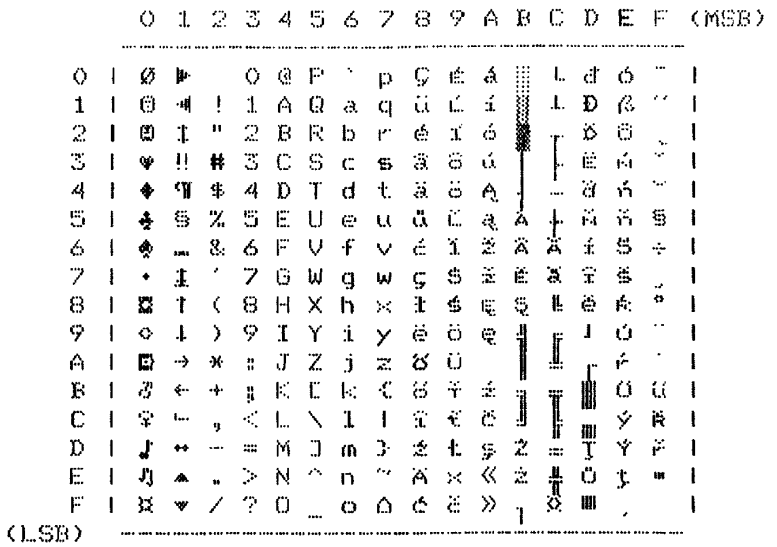


EBCDIC Draft

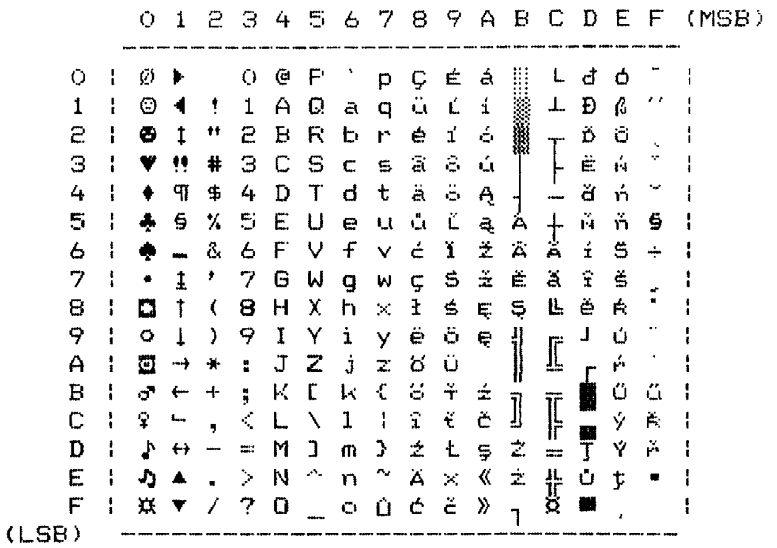


EBCDIC Letter Quality

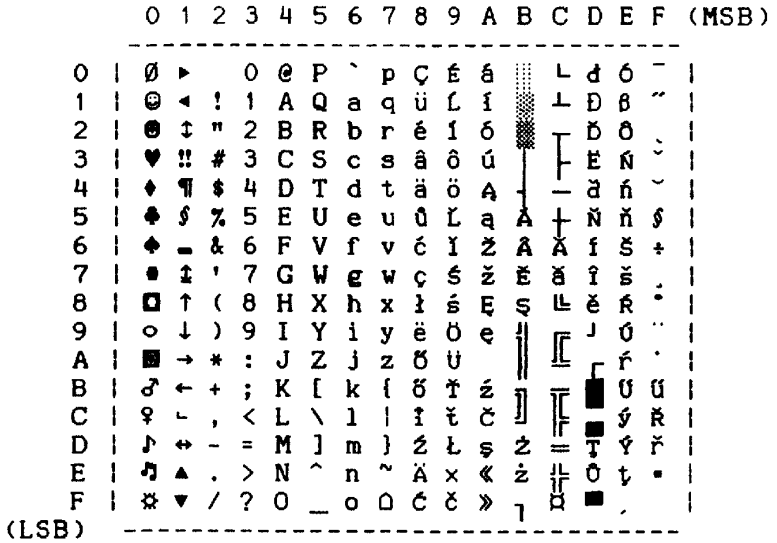




Latin 2 (Slavic) Fast Draft

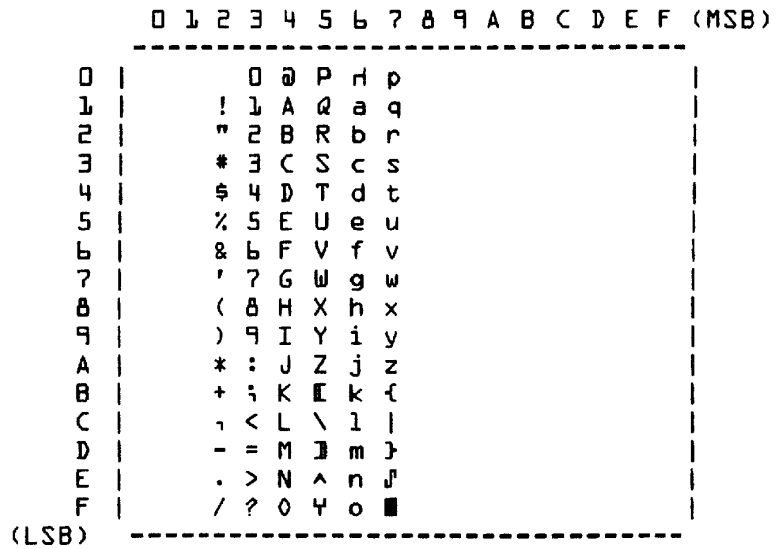


Latin 2 (Slavic) Draft



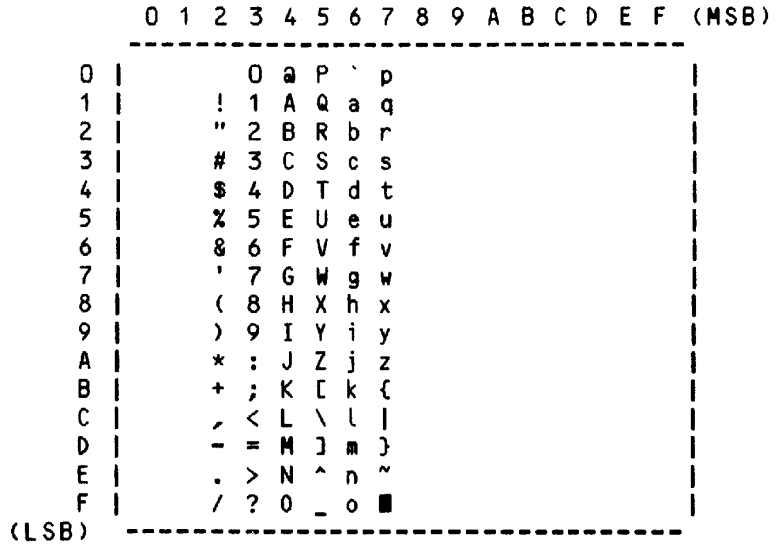
Latin 2 (Slavic) Letter Quality

OCR A



	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p								
1			!	1	A	Q	a	q								
2			"	2	B	R	b	r								
3			#	3	C	S	c	s								
4			$	4	D	T	d	t								
5			%	5	E	U	e	u								
6			&	6	F	V	f	v								
7			'	7	G	W	g	w								
8			(	8	H	X	h	x								
9			)	9	I	Y	i	y								
A			*	:	J	Z	j	z								
B			+	;	K	[	k	{								
C			,	<	L	\	l	|							
D			-	=	M	]	m	}								
E			.	>	N	^	n	~								
F			/	?	O	_	o									

OCR B



	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p								
1			!	1	A	Q	a	q								
2			"	2	B	R	b	r								
3			#	3	C	S	c	s								
4			$	4	D	T	d	t								
5			%	5	E	U	e	u								
6			&	6	F	V	f	v								
7			'	7	G	W	g	w								
8			(	8	H	X	h	x								
9			)	9	I	Y	i	y								
A			*	:	J	Z	j	z								
B			+	;	K	[	k	{								
C			,	<	L	\	l	|							
D			-	=	M	]	m	}								
E			.	>	N	^	n	~								
F			/	?	O	_	o									

DECIMAL-TO-OCTAL-TO-HEXADECIMAL-TO-ASCII CONVERSION TABLE

Dec	Oct	Hex	ASCII	Dec	Oct	Hex	ASCII	Dec	Oct	Hex	Dec	Oct	Hex
0	000	00	NUL	64	100	40	@	128	200	80	192	300	C0
1	001	01	SOH	65	101	41	A	129	201	81	193	301	C1
2	002	02	STX	66	102	42	B	130	202	82	194	302	C2
3	003	03	ETX	67	103	43	C	131	203	83	195	303	C3
4	004	04	EOT	68	104	44	D	132	204	84	196	304	C4
5	005	05	ENQ	69	105	45	E	133	205	85	197	305	C5
6	006	06	ACK	70	106	46	F	134	206	86	198	306	C6
7	007	07	BEL	71	107	47	G	135	207	87	199	307	C7
8	010	08	BS	72	110	48	H	136	210	88	200	310	C8
9	011	09	HT	73	111	49	I	137	211	89	201	311	C9
10	012	0A	LF	74	112	4A	J	138	212	8A	202	312	CA
11	013	0B	VT	75	113	4B	K	139	213	8B	203	313	CB
12	014	0C	FF	76	114	4C	L	140	214	8C	204	314	CC
13	015	0D	CR	77	115	4D	M	141	215	8D	205	315	CD
14	016	0E	SO	78	116	4E	N	142	216	8E	206	316	CE
15	017	0F	SI	79	117	4F	O	143	217	8F	207	317	CF
16	020	10	DLE	80	120	50	P	144	220	90	208	320	D0
17	021	11	XON	81	121	51	Q	145	221	91	209	321	D1
18	022	12	DC2	82	122	52	R	146	222	92	210	322	D2
19	023	13	XOFF	83	123	53	S	147	223	93	211	323	D3
20	024	14	DC4	84	124	54	T	148	224	94	212	324	D4
21	025	15	NAK	85	125	55	U	149	225	95	213	325	D5
22	026	16	SYN	86	126	56	V	150	226	96	214	326	D6
23	027	17	ETB	87	127	57	W	151	227	97	215	327	D7
24	030	18	CAN	88	130	58	X	152	230	98	216	330	D8
25	031	19	EM	89	131	59	Y	153	231	99	217	331	D9
26	032	1A	SUB	90	132	5A	Z	154	232	9A	218	332	DA
27	033	1B	ESC	91	133	5B	[	155	233	9B	219	333	DB
28	034	1C	FS	92	134	5C	\	156	234	9C	220	334	DC
29	035	1D	GS	93	135	5D	]	157	235	9D	221	335	DD
30	036	1E	RS	94	136	5E	^	158	236	9E	222	336	DE
31	037	1F	US	95	137	5F	_	159	237	9F	223	337	DF
32	040	20	SP	96	140	60	`	160	240	A0	224	340	E0
33	041	21	!	97	141	61	a	161	241	A1	225	341	E1
34	042	22	"	98	142	62	b	162	242	A2	226	342	E2
35	043	23	#	99	143	63	c	163	243	A3	227	343	E3
36	044	24	$	100	144	64	d	164	244	A4	228	344	E4
37	045	25	%	101	145	65	e	165	245	A5	229	345	E5
38	046	26	&	102	146	66	f	166	246	A6	230	346	E6
39	047	27	'	103	147	67	g	167	247	A7	231	347	E7
40	050	28	(	104	150	68	h	168	250	A8	232	350	E8
41	051	29	)	105	151	69	i	169	251	A9	233	351	E9
42	052	2A	*	106	152	6A	j	170	252	AA	234	352	EA
43	053	2B	+	107	153	6B	k	171	253	AB	235	353	EB
44	054	2C	,	108	154	6C	l	172	254	AC	236	354	EC
45	055	2D	-	109	155	6D	m	173	255	AD	237	355	ED
46	056	2E	.	110	156	6E	n	174	256	AE	238	356	EE
47	057	2F	/	111	157	6F	o	175	257	AF	239	357	EF
48	060	30	0	112	160	70	p	176	260	B0	240	360	F0
49	061	31	1	113	161	71	q	177	261	B1	241	361	F1
50	062	32	2	114	162	72	r	178	262	B2	242	362	F2
51	063	33	3	115	163	73	s	179	263	B3	243	363	F3
52	064	34	4	116	164	74	t	180	264	B4	244	364	F4
53	065	35	5	117	165	75	u	181	265	B5	245	365	F5
54	066	36	6	118	166	76	v	182	266	B6	246	366	F6
55	067	37	7	119	167	77	w	183	267	B7	247	367	F7
56	070	38	8	120	170	78	x	184	270	B8	248	370	F8
57	071	39	9	121	171	79	y	185	271	B9	249	371	F9
58	072	3A	:	122	172	7A	z	186	272	BA	250	372	FA
59	073	3B	;	123	173	7B	{	187	273	BB	251	373	FB
60	074	3C	<	124	174	7C	|	188	274	BC	252	374	FC
61	075	3D	=	125	175	7D	}	189	275	BD	253	375	FD
62	076	3E	>	126	176	7E	~	190	276	BE	254	376	FE
63	077	3F	?	127	177	7F	DEL	191	277	BF	255	377	FF

APPENDIX F

CONTROL CODE AND ESCAPE SEQUENCE SUMMARIES

ANSI x3.64 Emulation

BEL	Bell
BS	Backspace
CR	Carriage Return
CSI	Control Sequence Introducer
ESC D	Line Feed
ESC E	New Line
ESC ESC *n*	Select Software Interface *n*
ESC H	Set Horizontal Tab Stop
ESC J	Set Vertical Tab Stop
ESC K	Partial Line Down
ESC L	Partial Line Up
ESC [*n1* ; *n2* SP G	Set Character and Line Spacing
ESC [*n* `	Absolute Horizontal Tab
ESC [*n* a	Relative Horizontal Tab
ESC [*n* d	Absolute Vertical Tab
ESC [*n* e	Relative Vertical Tab
ESC [g	Clear Horizontal Tab Stop
ESC [0 g	Clear Horizontal Tab Stop
ESC [1 g	Clear Vertical Tab Stop
ESC [2 g	Clear All Horizontal Tab Stops
ESC [3 g	Clear All Horizontal Tab Stops
ESC [4 g	Clear All Vertical Tab Stops
ESC [20 h	Select Automatic Carriage Return
ESC [20 l	Cancel Automatic Carriage Return
ESC [*n* m	Select Graphic Rendition
ESC c	Reset
ETX	End of Text
FF	Form Feed
HT	Horizontal Tab
HTS	Set Horizontal Tab Stop
IND	Line Feed
LF	Line Feed
NEL	New Line
PLD	Partial Line Down
PLU	Partial Line Up
VT	Vertical Tab
VTS	Set Vertical Tab Stop

Epson FX Emulation

BEL	Bell
BS	Backspace
CAN	Cancel Line
CR	Carriage Return
DC2	Cancel Condensed Mode
DC3	Deselect Printer
DC4	Cancel Double-Wide Mode (one line)
DEL	Delete Character
ESC ! *n*	Master Print Mode Select
ESC #	Cancel MSB Control
ESC $ *n1 n2*	Absolute Horizontal Tab
ESC * *m n1 n2 data*	*m* DPI Graphics
ESC - *n*	Underline Mode
ESC 0	Select 8 LPI
ESC 1	Set Line Spacing to 7/72"
ESC 2	Select 6 LPI
ESC 3 *n*	Set Line Spacing to *n*/216"
ESC 4	Select Italic Mode
ESC 5	Cancel Italic Mode
ESC 6	Enable Printing of High Symbols
ESC 7	Disable Printing of High Symbols
ESC <	Unidirectional Mode (one line)
ESC =	Set MSB to 0
ESC >	Set MSB to 1
ESC @	Reset
ESC A *n*	Set Line Spacing to *n*/72"
ESC B *n1 n2 ... nx* NUL	Set Vertical Tab Stops
ESC C NUL *n*	Set Form Length in Inches
ESC C *n*	Set Form Length in Lines
ESC D *n1 n2 ... nx* NUL	Set Horizontal Tab Stops
ESC E	Select Emphasized Mode
ESC EM *n*	Load Form
ESC ESC *n*	Select Software Interface *n*
ESC F	Cancel Emphasized Mode
ESC G	Select Double-Strike Mode
ESC H	Cancel Double-Strike Mode
ESC I *n*	Printing of Low Symbols
ESC J *n*	Variable Distance Line Feed
ESC K *n1 n2 data*	60 DPI Graphics
ESC L *n1 n2 data*	120 DPI Graphics
ESC M	Select 12 CPI
ESC N *n*	Set Perforation Skip
ESC O	Cancel Perforation Skip
ESC P	Select 10 CPI
ESC Q *n*	Set Right Margin
ESC R *n*	Select International Character Set
ESC S *n*	Select Subscript or Superscript Mode
ESC SI	Select Condensed Mode
ESC SO	Select Double-Wide Mode (one line)
ESC T	Cancel Subscript and Superscript Mode
ESC U *n*	Unidirectional Mode
ESC W *n*	Double-Wide Mode
ESC Y *n1 n2 data*	High Speed 120 DPI Graphics
ESC Z *n1 n2 data*	High Speed 240 DPI Graphics
ESC \ n1 n2	Relative Horizontal Tab
ESC g	Select 15 CPI
ESC j *n*	Variable Distance Reverse Line Feed
ESC k *n*	Select Font

Epson FX Emulation (continued)

ESC l *n*	Set Left Margin
ESC t *n*	Character Table (Italic vs. Extended)
ESC w *n*	Double-High Mode
ESC x *n*	Select Draft or Letter Quality
ETX	End of Text
FF	Form Feed
HT	Horizontal Tab
LF	Line Feed
SI	Select Condensed Mode
SO	Select Double-Wide Mode (one line)
VT	Vertical Tab
XOFF	Deselect Printer

IBM Proprinter Emulation

BEL	Bell
BS	Backspace
CAN	Cancel Line
CR	Carriage Return
DC2	Select 10 CPI
DC4	Cancel Double-Wide Mode (one line)
ESC - *n*	Underline Mode
ESC 0	Select 8 LPI
ESC 1	Set Line Spacing to 7/72"
ESC 2	Start Line Spacing
ESC 3 *n*	Set Line Spacing to *n*/216"
ESC 4	Set Top of Form
ESC 5 *n*	Automatic Line Feed
ESC 6	Select Character Set 2
ESC 7	Select Character Set 1
ESC :	Select 12 CPI
ESC A *n*	Set Line Spacing to *n*/72"
ESC B *n1 n2 ... nx* NUL	Set Vertical Tab Stops
ESC C NUL *n*	Set Form Length in Inches
ESC C *n*	Set Form Length in Lines
ESC D *n1 n2 ... nx* NUL	Set Horizontal Tab Stops
ESC E	Select Emphasized Mode
ESC ESC *n*	Select Software Interface *n*
ESC F	Cancel Emphasized Mode
ESC G	Select Double-Strike Mode
ESC H	Cancel Double-Strike Mode
ESC I *n*	Select Print Mode
ESC J *n*	Variable Distance Line Feed
ESC K *n1 n2 data*	60 DPI Graphics
ESC L *n1 n2 data*	120 DPI Graphics
ESC N *n*	Set Perforation Skip
ESC O	Cancel Perforation Skip
ESC Q *n*	Deselect Printer
ESC R	Reset Horizontal and Vertical Tab Stops
ESC S *n*	Select Subscript or Superscript Mode
ESC SI	Select Condensed Mode
ESC SO	Select Double-Wide Mode (one line)
ESC T	Cancel Subscript and Superscript Mode
ESC U *n*	Unidirectional Mode
ESC W *n*	Double-Wide Mode
ESC X *n1 n2*	Set Left and Right Margin
ESC Y *n1 n2 data*	High Speed 120 DPI Graphics
ESC Z *n1 n2 data*	High Speed 240 DPI Graphics
ESC [@ *n1 n2 m1 m2 m3 m4*	Double-High Mode
ESC \ *n1 n2*	Print Characters
ESC ^ *n*	Print Single Character
ETX	End of Text
FF	Form Feed
HT	Horizontal Tab
LF	Line Feed
SI	Select Condensed Mode
SO	Select Double-Wide Mode (one line)
VT	Vertical Tab

LA-120 Emulation

BEL	Bell
BS	Backspace
CR	Carriage Return
CSI	Control Sequence Introducer
DEL	Delete
ESC (*a*	Select International Character Set
ESC 1	Set Horizontal Tab Stop
ESC 2	Clear All Horizontal Tab Stops
ESC 3	Set Vertical Tab Stop
ESC 4	Clear All Vertical Tab Stops
ESC D	Line Feed
ESC E	New Line
ESC ESC *n*	Select Software Interface *n*
ESC H	Set Horizontal Tab Stop
ESC J	Set Vertical Tab Stop
ESC [	Control Sequence Introducer
ESC [*n* `	Absolute Horizontal Tab
ESC [*n* a	Relative Horizontal Tab
ESC [c	Printer Identification
ESC [0 c	Printer Identification
ESC [*n* d	Absolute Vertical Tab
ESC [*n* e	Relative Vertical Tab
ESC [g	Clear Horizontal Tab Stop
ESC [0 g	Clear Horizontal Tab Stop
ESC [1 g	Clear Vertical Tab Stop
ESC [2 g	Clear All Horizontal Tab Stops
ESC [3 g	Clear All Horizontal Tab Stops
ESC [4 g	Clear All Vertical Tab Stops
ESC [20 h	Select Automatic Carriage Return
ESC [20 l	Cancel Automatic Carriage Return
ESC [*n* m	Select Graphic Rendition
ESC [*n1* ; *n2* r	Set Top and Bottom Margins
ESC [*n1* ; *n2* s	Set Left and Right Margin
ESC [*n* t	Set Form Length in Lines
ESC [*n1* ; *n2* ; ... *nx* u	Set Horizontal Tab Stops
ESC [*n1* ; *n2* ; ... *nx* v	Set Vertical Tab Stops
ESC [*n* w	Set Character Spacing
ESC [*n* z	Set Line Spacing
ETX	End of Text
FF	Form Feed
HT	Horizontal Tab
HTS	Set Horizontal Tab Stop
IND	Line Feed
LF	Line Feed
NEL	New Line
VT	Vertical Tab
VTS	Set Vertical Tab Stop

Simple TTY Emulation

BEL	Bell
BS	Backspace
CR	Carriage Return
ESC ESC *n*	Select Software Interface *n*
ETX	End of Text
FF	Form Feed
HT	Horizontal Tab
LF	Line Feed
VT	Vertical Tab

Printek Emulation

BEL	Bell
BS	Backspace
CR	Carriage Return
DC3	Deselect Printer
ESC # *m n1 n2 data*	*m* DPI Graphics
ESC %	Line Feed Boundary
ESC * *m n1 n2 data*	*m* DPI Graphics
ESC @	Reset
ESC A *n*	Automatic Modes
ESC B *n*	Auto Cut Mode
ESC C	Cut
ESC D *n*	Double-Strike Mode
ESC E *n*	Emphasized Mode
ESC ESC *n*	Select Software Interface *n*
ESC F *n*	Select Font
ESC FF *n*	Set Form Length in Lines
ESC G *n*	Modify Print Head Gap
ESC H *n1 n2*	Set Left and Right Margin
ESC HT *n1 n2 ... nx* NUL	Set Horizontal Tab Stops
ESC I *n*	Set Print Head Force
ESC L *n*	Load Form
ESC LF *n*	Set Line Spacing to *n*/288"
ESC R	Reset Horizontal and Vertical Tab Stops
ESC S *n*	Select Script Modes
ESC SP *n*	Set character Spacing
ESC U *n*	Unidirectional Mode
ESC V *n1 n2*	Set Top and Bottom Margins
ESC VT *n1 n2 ... nx* NUL	Set Vertical Tab Stops
ESC W *n*	Double-Wide Mode
ESC \ *n*	Print Single Character
ESC ^	Reverse Line Feed
ESC _ *n*	Underline Mode
ETX	End of Text
FF	Form Feed
HT	Horizontal Tab
LF	Line Feed
VT	Vertical Tab
XOFF	Deselect Printer

APPENDIX G

PRINTER RESET CONDITIONS

The following list describes conditions that are assumed whenever power is applied to the printer, the SETUP mode is exited, or a reset escape sequence is received (when the printer is operating in an emulation mode that supports such a sequence).

This list includes all variables that you can modify for all emulations, even though some emulations cannot modify all of the variables shown. Refer to the appropriate section of this manual for the emulation you are using.

Variable	Reset Condition
character pitch	according to current form setup
left margin	according to current form setup
right margin	according to current form setup
line pitch	according to current form setup
form length	according to current form setup
top margin	according to current form setup
bottom margin	according to current form setup
font	according to current form setup
impact mode	according to current form setup
language	according to current form setup
normal/slashed zero	according to current form setup
auto cut mode	according to current form setup
unidirectional mode	according to current form setup
top of form	set to current position
text in an incomplete line	discarded
input buffer	cleared (unless reset from host)
control of data bit 8	accepted as received
control character symbols	according to interface setup
italics	off
double high	off
double strike	off
double wide	off
emphasized	off
superscript/subscript	off
underline	off
horizontal tabs	to every eight columns
vertical tabs	cleared

APPENDIX H

CLONING PRINTER SETUP

The FormsPro 4300 and 450X printers contain a significant amount of setup information, including form parameters for 10 different forms, I/O interface parameters, and option parameters for options like the FormsCutter and Imager/ImagerPlus.

The printer cloning feature allows the setup information in one printer to be copied to another printer. Once one printer is setup exactly as desired, the setup information can be easily and precisely duplicated in other printers. This is very helpful if a company uses many printers, all of which must be configured the same way. It may also be helpful if one printer is to be replaced by another.

CLONING FROM PRINTER TO PRINTER

To copy the setup information from one printer to another, the following steps are required:

1. Connect the two printers with an RS-232 Null Modem Cable with DB-25 Male connectors on each end. While most null modem cables provide many other signals, the only signals that are required are shown below. A cable which meets these requirements is available from Printek.

   It doesn't matter which end of the cable is connected to which printer; the cable will work fine in either direction. Turn both printers on.

RS-232 Cloning Cable Requirements

DB-25M		DB-25M
Pin 2	ÄÄÄ

3. Enter setup mode on the printer that will transmit its setup information. In the "Setup: SECURITY" menu find the "Clone: Off" function and change it to "Clone: Transmit". Exit setup mode. The printer will reset, and then display the message "Cloning/Transmit". The printer will now transmit its setup information.

4. The setup information should be successfully copied from one printer to the other within a few seconds. Each printer will display the message "Cloning Complete". Each printer will then reset, after which it will be ready for normal operation (clone will be set to off). Remove the special serial cable that was used to connect the two printers.

Possible Cloning Errors

Extensive error checking is done during the cloning process. If a problem occurs, one or both printers will sound the bell and display the message "Cloning Error!".

If a cloning error occurs at the receiving printer, make sure that it is not timing out. The receiving printer will wait about 60 seconds for setup information to be transmitted; it will then time out and a cloning error will occur. After the receiving printer is ready, immediately prepare the transmitting printer.

If a cloning error occurs at the transmitting printer, make sure that the receiving printer is ready. The transmitting printer expects an immediate response from the receiving printer, so be sure to prepare the receiving printer first.

If a cloning error still occurs, make sure the special serial cable is connecting the two printers.

Information that is Cloned

When setup information is copied from one printer to another, all values in the "Setup: FORMS", "Setup: INTERFACE", "Setup: OPTIONS", and "Setup: SECURITY" menus are copied, *except* for values that are hardware dependent.

Specifically, the following hardware dependent parameters are not copied. In the "Setup: FORMS" menu, the "Prnt Adj" and "Cut Adj" parameters are not copied. In the "Setup: OPTIONS" menu, the "Paper Cutter: No/Yes" and "Imager: No/Yes" parameters are not copied. Note that other parameters related to the paper cutter and Imager are copied.

After cloning is performed, the clone parameter will always be set to "Clone: Off" in the "Setup: SECURITY" menu, for both the transmitting and receiving printers. This will be true even if a "Cloning Error!" occurs. If a "Cloning Error!" occurs in the receiving printer, none of its other setup information will be changed.

USING A SETUP UNIT FOR CLONING

Cloning can be accomplished using only the special serial cable available from Printek, and the transmitting and receiving printers. However, a Setup Unit which is also available from Printek can make cloning much easier.

The Setup Unit acts as an intermediary between the transmitting and receiving printers, so the two printers do not have to be hooked directly together. If the two printers are not already in the same location, the Setup Unit is beneficial because it is much more portable than a printer. Use of the Setup Unit can be especially convenient if setup information from one printer is to be cloned to many other printers.

Cloning from a Printer to a Setup Unit

To copy the setup information from a printer to the Setup Unit, the following steps are required:

1. Connect the Setup Unit's serial cable to the printer. Plug in the Setup Unit's power supply and turn the printer on.

2. Set the toggle switch on the Setup Unit to "Receive". Press the START button. The yellow "Wait" LED will turn on. The green "Complete" and the red "Error" LED's will be off. The Setup Unit is now ready to receive new setup information.

3. Enter setup mode on the printer. In the "Setup: SECURITY" menu find the "Clone: Off" function and change it to "Clone: Transmit". Exit setup mode. The printer will reset, and then display the message "Cloning/Transmit". The printer will now transmit its setup information.

4. The setup information should be successfully copied from the printer to the Setup Unit within a few seconds. The Setup Unit will turn off the yellow "Wait" LED and turn on the green "Complete" LED. The printer will display the message "Cloning Complete". The printer will then reset, after which it will be ready for normal operation (clone will be set to off). Disconnect the Setup Unit's serial cable from the printer.

Extensive error checking is done during the cloning process. If a problem occurs, the Setup Unit will turn on the red "Error" LED and/or the printer will sound the bell and display the message "Cloning Error!".

If a cloning error occurs at the Setup Unit, make sure that it is not timing out. The Setup Unit will wait about 60 seconds for setup information to be transmitted from the printer. It will then time out and a cloning error will occur if nothing has been received from the printer. After the Setup Unit is ready, immediately prepare the transmitting printer.

If a cloning error occurs at the printer, make sure that the Setup Unit is ready. The transmitting printer expects an immediate response from the Setup Unit, so be sure to prepare the Setup Unit first.

If a cloning error still occurs, make sure the Setup Unit's serial cable is connected to the printer. Also, make sure that the toggle switch on the Setup Unit is set to “Receive “. Finally, make sure that the Setup Unit's green “Power” LED is lit.

Cloning from a Setup Unit to a Printer

To copy the setup information from a Setup Unit to a printer, the following steps are required:

1. Connect the Setup Unit's serial cable to the printer. Plug in the Setup Unit’s power supply and turn the printer on.

2. Enter setup mode on the printer. In the “Setup: SECURITY” menu find the “Clone: Off” function and change it to “Clone: Receive”. Exit setup mode. The printer will reset, and then display the message “Cloning/Receive”. The printer is now ready to receive new setup information.

3. Set the toggle switch on the Setup Unit to “Transmit”. Press the START button. The yellow “Wait” LED will turn on. The green “Complete” and the red “Error” LED's will be off. The Setup Unit will now transmit its setup information.

4. The setup information should be successfully copied from the Setup Unit to the printer within a few seconds. The Setup Unit will turn off the yellow “Wait” LED and turn on the green “Complete” LED. The printer will display the message “Cloning Complete”. The printer will then reset, after which it will be ready for normal operation. Disconnect the Setup Unit's serial cable from the printer.

Extensive error checking is done during the cloning process. If a problem occurs, the Setup Unit will turn on the red “Error” LED and/or the printer will sound the bell and display the message “Cloning Error!”.

If a cloning error occurs at the printer, make sure that it is not timing out. The receiving printer will wait about 60 seconds for setup information to be transmitted; it will then time out and a cloning error will occur. After the printer is ready, immediately prepare the transmitting Setup Unit.

If a cloning error occurs at the Setup Unit, make sure that the receiving printer is ready. The Setup Unit expects an immediate response from the printer, so be sure to prepare the printer first.

If a cloning error still occurs, make sure the Setup Unit's serial cable is connected to the printer. Also, make sure that the toggle switch on the Setup Unit is set to “Transmit”. Finally, make sure that the Setup Unit's green “Power” LED is lit.

APPENDIX I

PRINTER SPECIFICATIONS

PRINT MODES

Print Speeds

Print Mode	FormsPro 4300		FormsPro 4500		FormsPro 4503	
Fast Draft	300	cps	530	cps	530	cps
Draft	225	cps	400	cps	400	cps
Fast Draft High Impact	150	cps	265	cps	265	cps
Draft High Impact	110	cps	200	cps	200	cps
Letter Quality	55	cps	100	cps	100	cps
Optical Quality	37.5	cps	65	cps	65	cps
Graphics	8,640	dps	15,360	dps	15,360	dps

CHARACTER MATRIX

Fast Draft 7x9 in 9x9 cell.
Draft 9x9 in 12x9 cell.
Letter Quality 18x18 in 24x18 cell.
Optical Quality 27x18 in 36x18 cell.

GRAPHICS DENSITY

60 to 240 dpi horizontally x 72 dpi vertically .**

CHARACTER SETS

Epson FX fast draft, draft and letter quality.
IBM Proprinter fast draft, draft and letter quality.
EBCDIC fast draft, draft and letter quality.
Latin II (Slavic) fast draft, draft, and letter quality.
OCR-A optical quality.
OCR-B optical quality.

CHARACTER SPACING

5, 6, 6.7, 7.5, 8.4, 8.6, 10, 12, 13.3, 15, 16.7, 17.1, and 20 cpi .**

LINE SPACING

6 lpi, 8 lpi, or programmable in 1/216th or 1/288th of an inch. **

LINE LENGTH

13.6 inches.

CONTROL CODE AND ESCAPE SEQUENCE EMULATIONS

ANSI X3.64.
Epson FX Series.
IBM Proprinter.
DEC LA-120.
Simple TTY.
Printek.
Bar Code.

PAPER HANDLING

Bottom tractor feed.

Straight paper path with zero waste tear off (can print first to last line of form; can print to within 2" of bottom of last form.).

Paper width: 2 to 16 inches.

Paper Slew Rate: 12 inches per second.

RIBBON

23,000,000 character, mobius loop cartridge.

SPECIAL FORMS HANDLING FEATURES

Print up to nine part forms (.025" maximum thickness).
Unit opens for easy access to tractors.
Automatic loading/unloading of forms.
Automatic head gap.
Paper out sensing.
Paper motion sensing.
Paper edge sensing.

Nonvolatile memory for ten form setups. Parameters for each form include: tractor path (only in FormsPro 4503), automatic forms cutting (only if FormsCutter is installed), cpi, left margin, right margin, lpi, form length, top margin, bottom margin, scroll distance, cut position adjust, print position adjust, font, character impact mode, language**, slashed or nonslashed zero, and unidirectional printing.

Obstruction free exit path (no cables in path).

COMPUTER INTERFACE

Asynchronous RS-232: 150 to 19,200 baud; Even, Odd, Ignore or No parity; 7 or 8 data bits; 1 stop bit; XON/XOFF, ETX/ACK, and Hardware handshake.

Centronics compatible Parallel.

Coaxial/Twinaxial.***

Input Buffer: 4096 (4K).

OPERATOR CONTROLS/INDICATORS

Normal Operating Mode

Indicators: LED's for Power, Online, and Fault; 1x16 character LCD for current form selection (and paper path in FormsPro 4503), on/off line status and fault descriptions.

Controls: Online, Form Feed/Load, Form Select/Unload, Align Up, Align Down, and enter Setup.

Setup Mode

Indicators: LED to indicate setup mode is active.

Controls: Next Function, Previous Function, Next Value, Previous Value, and Exit Setup.

Setup Features: Form menu for setting form and printing parameters, Interface menu for setting all I/O parameters, Option menu for setting/installing option parameters, and Security menu for disabling changes to interface, form, and option settings.

RELIABILITY

No electronic adjustments. Unit automatically measures and sets operating parameters each time unit is powered on.

Print head has forced air cooling.

MTBF 10,000 hours on electronics with no duty cycle limitation.

Print head life of 300,000,000 draft equivalent characters on FormsPro 4300 or 500,000,000 draft equivalent characters on FormsPro 4500 and FormsPro 4503. Printer life excluding print head of 1,000,000 pages.

Warranty:

Printer: One year limited warranty for defects in materials and/or workmanship.

Print Head: FormsPro 4300 - 300 million draft equivalent character life.
FormsPro 4500 and FormsPro 4503 - 500 million draft equivalent character life.
One year limited warranty for defects in materials and/or workmanship. Print head warranty may be extended to a two year limited warranty with the use of Printek brand ribbons.

ENVIRONMENTAL SPECIFICATIONS

Power requirements: 120 VAC 10%, 60Hz.
Power consumption: FormsPro 4300 - 60 W non-printing, 200 W printing.
FormsPro 4500 and FormsPro 4503 - 60 W non-printing, 225 W printing.
Audible noise: <65 dBA, cooling fan automatically switches to low speed when not printing.
Operating Temperature: 50 degrees F to 95 degrees F.
Relative Humidity: 20% to 80% non-condensing.
Physical Size: 9.5" High x 25" Wide x 20.3" Deep.
Weight: FormsPro 4300 and FormsPro 4500 - 53 lbs (61 lbs shipping);
FormsPro 4503 - 60 lbs (68 lbs shipping).

OPTIONS

Additional 24,576 (24K) character input buffer.
RS-422 serial interface.
Coaxial/Twinaxial interface (includes RS-232 serial and standard parallel).
Imager or ImagerPlus Bar Code support.

Paper Cutter.
Print Stand.

** May be emulation dependent.
*** Only included in units with the coaxial/twinaxial interface.

Specifications subject to change without notice.

APPENDIX J

SETUP MENU SUMMARIES

Setup: FORMS
(One Beep)

- **Form #:** 0 - 9
- **F# Path:** Front, Center, or Rear †
- **F# Auto Cut:** Yes or No* †
- **F# CPI:** 10*, 12, 13.3, 15, 16.74, 17.14, or 20
- **F# Left Mar:** 0* through 134
- **F# Right Mar:** 1 through 255, or MAX*
- **F# LPI:** 6* or 8
- **F# Length:** 1 through 227 (66*)
- **F# Top Mar:** 0* through 255
- **F# Btm Mar:** 0* through 255
- **F# Scroll+:** 0* through 127
- **F# Cut Adj:** -85 to +84, 0*, or Auto †
- **F# Prnt Adj:** -128 through +127 or 0*
- **F# Font:** FX FD, FX DF, FX LQ, PC FD, PC DF, PC LQ, EB FD, EB DF, EB LQ, OCRA-OQ, OCRB OQ,
- **F# Impact:** Norm* or High
- **F# Lang:** USA*, France, Germany, England, Denmark, Sweden, Italy, Spain, or Japan
- **F# Zero:** Normal* or Slashed
- **F# Unidir:** Yes or No*

* Indicates the factory default setting.

† Indicates a menu function and/or value which may not be available unless the appropriate option is installed, or selected, in the printer.

Setup: INTERFACE
(Two Beeps)

Mode: Test, ANSI X3.64, Epson*, Bar Codes, Proprinter, LA-120, TTY, Printek, Barberpole, or Hex Dump
I/O: Parallel*, Serial, or CX/TX †
Baud Rate: 150, 300, 600, 1200, 2400, 4800, 9600*, or 19200 †
Data Bits: 7 or 8*
Parity: None*, Ignore, Odd, or Even †
Busy: Low* or High †
DTR: Power*, Online, or Busy †
XON/XOFF: Off* or On †
ETX/ACK: Off* or On †
Auto CR: Off* or On
Auto LF: Off* or On
Long Line: Wrap* or Trunc
Left Edge: Fixed or Float*
FF at TOF: Yes* or No
Scroll Delay: 1* or 0 through 15
Fault: Break Pg*, or Reprint Pg
Page Size: 256* or 512 through 28160 †
Chars: Control* or Printable

Setup: OPTIONS
(Three Beeps)

Max Form #: 0 through 9
Ribbon Check: On*, Off
Ribbon Life: 23*, or 5 through 30
Paper Cutter: Yes or No*
Imager: Yes or No*
Translation: Off* or On †
Free Format: Off* or On †
Terminator: LF* or CR †
Ignore Char: Off* or On †
Zero: Normal or Slashed* †
Ignore Col 1: Yes or No* †
Control Char: ^*, ~, !, ?, ;, ', |, or \ †
Bar Codes: Lo-Res, Med-Res, Hi-Res* †

Setup: SECURITY
(Four Beeps)

Forms: Edit*, View, or Init
Interface: Edit*, View, or Init
Options: Edit*, View, or Init
Clone: Off*, Transmit, Receive

* Indicates the factory default setting.
† Indicates a menu function and/or value which may not be available unless the appropriate option is installed, or selected, in the printer.

GLOSSARY

ANSI	American National Standards Institute.
ASCII	American Standard Code for Information Interchange.
baud rate	The rate at which characters are transmitted over a serial interface. This is usually the same as bits-per-second.
binary	Base two numbering system. Digits are represented by the characters 0 and 1.
bit	A single binary digit.
control code	A single, non-printing character which is used to control the configuration or operation of the printer.
character pitch	The horizontal spacing of characters. Measured in cpi.
cpi	Characters-per-inch.
cps	Characters-per-second.
current line	The line upon which the next character will be printed.
current print position	The column on the current line where the next character will be printed.
default	Value or configuration that is assumed when the printer is turned on or reset.
dpi	Dots-per-inch. Generally used to refer to graphics density or resolution.
draft	Refers to the draft font.
EBCDIC	Extended Binary Coded Decimal Interchange Code.
escape sequence	String of characters beginning with the escape (ESC) character which is used to control the configuration or operation of the printer. The characters which are part of this string are not printed.
fast draft	Refers to the fast draft font.

font	A group of characters of a given shape or style.
hexadecimal	Base sixteen numbering system. Digits are represented by the characters 0 through 9 and A through F.
interface	The connection between the printer and the host computer.
LCD	Liquid-crystal display.
LED	Light-emitting diode.
line pitch	The vertical spacing of characters. Measured in lpi.
lpi	Lines-per-inch.
LQ	Letter Quality.
MSB	Most-significant bit or byte. In a character, this refers to bit seven (of 0 to 7).
octal	Base eight numbering system. Digits are represented by the characters 0 through 7.
offline	Refers to the state of the printer when the "ONLINE" indicator is off and the printer does not respond to the host computer.
online	Refers to the state of the printer when the "ONLINE" indicator is on and the printer is responding to the commands and text received from the host computer.
OQ	Optical Quality.
parity	A method used for detecting errors within a single character transmitted or received via an interface.
reset	Initialization of various operating parameters of the printer to the value or state assumed when the printer is powered on.
top of form	The vertical position where the first line is printed on the paper. Also the position the paper is advanced to when a form feed (FF) character is received from the host or the Form Feed button is pressed on the printer's control panel.
tractors	Devices which control the movement of the paper through the printer.